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The North American Species of *Physalis* and related Genera.

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A revision of the genus *Physalis* is without doubt much needed. Any one who has tried, by means of our manuals, to identify the species growing in any part of the country, has failed more or less completely. Especially is this the case in the South and in the prairie states west of the Mississippi. The reason is not that the descriptions are so badly drawn, but that only about one-half of the actual number of species has, as a rule, been recognized. So, for instance, the State of Missouri has not less than 11 species, and Florida 13, while Gray's Synoptical Flora contains only 5 and 7 which are recorded as growing in those States respectively. And yet that work contains the best treatment of our native species. Even Nebraska was supposed to contain only two species and one variety. In 1891, when determining a collection made in the western part of that State for the United States Department of Agriculture, I came to the conclusion that the State had at least six good species. The plants were also determined afterwards by Mr. J. M. Holzinger. I was, however, satisfied neither with his determination nor with my own, and began from that time to study the genus, whenever I had any opportunity.

In 1894 I was called to Washington to prepare for publication the reports of two summers' field work done for the Department of Agriculture, and then had occasion to study the National Herbarium. I found, however, that the arrangement and determination of the specimens was not satisfactory. I also visited

both Columbia College and Harvard University, but the condition at neither place was much better. The trouble seemed to be that too many different forms were put together under the same name. I returned to the University of Nebraska with the determination to try to revise the genus if possible.

Through the negotiations of Dr. Chas. E. Bessey I secured the loan of nearly every collection of value in this country, both public and private. I hereby extend my thanks to professors and curators of the following institutions, whose collections I have used: United States Department of Agriculture, Missouri Botanical Garden (including the Engelmann and Bernhardt collections), Columbia College (including the Torrey and Meisner collections), Cornell University, University of Minnesota, University of Tennessee, University of Indiana, California Academy of Sciences, Philadelphia Academy of Sciences, Agricultural College of Iowa (including the Parry and Pammel collections), Agricultural College of Michigan, Oberlin College, Ind., Franklin and Marshall College, Lancaster, Pa., and the University of Wyoming,* and also to the following persons who kindly loaned me their private collections: Prof. E. L. Greene, Dr. J. M. Coulter, Prof. F. D. Kelsey, Dr. A. W. Chapman, Messrs. J. Donnell Smith, Walter Deane, Cambridge, Mass., B. S. Parish, San Bernardino, Cal., E. L. Sukdorf, White Salmon, Wash., Rev. A. B. Langlois, St. Martinsville, La.; Rev. L. H. Lighthipe, Woodbridge, N. J., and Miss Frances Wilson, Rocky Hill, Ct. Owing to certain rules passed by the Trustees of the Gray Herbarium, I could not secure the loan of the collection of *Physalis* at Harvard, but Dr. B. L. Robinson kindly sent all type specimens asked for, and last fall I had occasion to spend two days in the Gray Herbarium, when I saw the whole collection. For this privilege, as well as for the use of the botanical library there I am very grateful, as also for the privilege of looking over the herbarium of the College of Pharmacy, New York City. I also wish to extend my thanks to Dr. Chas. E. Bessey and Dr. N. L. Britton for valuable suggestions and help in my work.

The only collection in this country which I wished to see and

* Of course, I also had access to the herbaria of the University of Nebraska and of the Botanical Survey of the same State.

have not been able to examine is Elliott's herbarium at Charleston, S. C. It is a pity that this valuable collection should be at a place and in such condition that it is made nearly inaccessible to the botanical world.

At the suggestion of Dr. J. M. Coulter, I have extended the original plan by including in the monograph, the related genera *Margaranthus*, *Chamaesaracha* and *Oryctes*. The material used for the study of these genera has been more limited, consisting only of the collections of United States Department of Agriculture, Missouri Botanical Garden, Columbia College, College of Pharmacy, and Prof. E. L. Greene.

The revision includes not only the native and introduced species growing in the United States and Canada, but also a few Mexican ones, collected in the northern part of the border States, Lower California, Sonora, Chihuahua and Coahuila. They may at any time be expected to appear within our country. These species are: *Margaranthus tenuis*, *Physalis subulata*, *P. leptophylla*, *P. hastata* and *P. microphysa*.

Although most of the herbarium work on *Physalis* and also a part of the bibliographical work was done at the University of Nebraska, the most important part of the latter, the collation of the notes, the final arrangement and the preparation of the manuscript has been done at Columbia College, whose botanical library furnishes much better facilities. The whole work on *Margaranthus*, *Chamaesaracha* and *Oryctes*, has also been done at Columbia.

To give a list of all the books referred to, would be useless, as most of them are given in the bibliography under each species. The only monographs of real value in existence are those of Nees von Esenbeck, in *Linnaea*, Vol. VI, 1831; of Dunal, in *De Candolle's Prodrromus*, Vol. XIII, part 1, 1852; and of Asa Gray, in the *Proceedings of the American Academy of Arts and Sciences*, Vol. X, 1875, and in his *Synoptical Flora*, Vol. II, part 1, 1878. All these, however, are defective and incomplete. Many new species and forms have been discovered since the time of their publication, especially in the West and in Florida. More material has accumulated, which has made it possible to separate out as good species, forms that were imperfectly known to Dr. Gray, as, for instance, *Physalis lanceifolia* Nees, *P. Carpenteri* Riddell, *P. arenicola* Kearney,

P. macrophysa Rydberg, *P. versicolor* Rydberg and *P. ciliosa* and *Chamaesaracha crenata*, to be described below.

The limitation of the species here recognized, differs also from that of Dr. Gray. If he had treated *Physalis* as he did *Aster*, he would have had several more species and would not have united into one such as were rightly kept apart by Dunal. In a genus where the species are as closely related as they are in *Physalis* it is not easy to define the limits, especially as intermediate forms in most cases are found. I must confess that I am far from satisfied with my own treatment of *P. Philadelphica* and *P. heterophylla*. I suspect that each consists of more than one species, but I have been unable to find constant characters that would support a distinction.

In preparing a monograph of these genera,* I have naturally to consider the nomenclature of the species. I knew that it was not in the very best condition, but never imagined that it was in such chaos as I really found it. The following will show the most important cases where changes in the commonly accepted names are necessary. A practically full synonymy will be found under each species, but I feel that something needs to be said in the way of explanation. The changes mentioned are necessary not merely because the author has tried to follow the Rochester and Madison rules. They would have been just as necessary under any accepted rule except one, viz: "Use whatever name you please." Most of the errors are wrong identifications of species or misapplication of names. The changes here proposed are not hastily made, as I have compared all the species with the original descriptions and drawings and also with the type specimens when possible. I have had access to all types preserved in American herbaria, except one, viz: that of *P. lanceolata* Ell.,† but that name cannot stand as there is an older and accepted *P. lanceolata* Michx.‡ I have seen the original descriptions of all species and varieties, at least in reprint or in manuscript copies, and also that of nearly every synonym.

* The larger part of the following discussion, although under a different title, was read before the Botanical Seminar of the University of Nebraska, May 27, 1895.

† Ell. Bot. S. C. & Ga. 1: 278. 1817.

‡ Michx. Fl. Bor. Am. 1: 149. 1803.

In the first edition of Linnaeus' *Species Plantarum*, there are nine species of *Physalis* described, of which six are accredited to America. Of these six two are frutescent and are now referred to the genus *Withania*. Hence there remain only four American species which were known to Linnaeus in 1753, viz.: *P. viscosa*, *P. angulata*, *P. pubescens* and *P. pruinosa*. Besides these, *P. Alkekengi* has escaped from cultivation in a few places.

*Physalis Alkekengi** has been well understood from its first publication, and can scarcely be confounded with any of our native species. The whitish, more plainly 5-lobed corolla distinguishes it from all of them.

Physalis viscosa L.† is without any doubt the plant that now appears under that name in our manuals. The name *viscosa* refers to the viscid berry. Unfortunately there are several other species that have viscid fruit and the choice of name did not happen to be a good one. Thinking the name referred to the viscid pubescence, most of the earlier American authors, as Pursh, Eaton, Darlington, Beck, Torrey and at first also Gray, applied it to another perennial species, *Physalis heterophylla* Nees,‡ *P. Virginiana* Gray,§ not Mill.|| Roth applied it to *P. Barbadosensis*, and *P. viscosa* Jacq. is either *P. Virginiana* Mill. or *P. heterophylla* Nees. This may partly account for the many synonyms under *P. viscosa* L. Gmelin called it *P. nutans* and Walter *P. tomentosa*,¶ which was changed to *P. Walteri* by Nuttall,** as there were already two species which had been described under this name, viz: *P. tomentosa* Medicus†† and *P. tomentosa* Thunberg.‡‡

The remaining Linnaean species of 1753 are not as well understood. The diagnosis in each case is very vague and incomplete, and agrees as well or as badly with any of our annual species, and nobody can be sure that the name belongs to the species to which

* L. Sp. Pl. 183. 1753.

† L. Sp. Pl. 183. 1753.

‡ *Linnaea*, 6: 463. 1831.

§ Gray, *Syn. Fl.* 2: pt. 1, 235. 1878.

|| Mill. *Gard. Dict.* Ed. 8: no. 4. 1768.

¶ Walt. *Fl. Car.* 99. 1788.

** *Journ. Acad. Phil.* 7: 112. 1834.

†† *Act. Acad. Theod. Palat.* 4: 184. 1780.

‡‡ Thunb. *Prod. Pl. Cap.* 37. 1794.

it is commonly applied. As to *P. angulata* L.,* there has been some doubt as to whether it is the same as *P. angulata* of our manuals or *P. obscura* Michx.† Nees von Esenbeck‡ cited the latter as a synonym of *P. angulata* and for the plant that now goes under that name, he proposed the name *P. Linkiana*,§ as the only available synonym, *P. dubia* Link,|| was antedated by *P. dubia* Gmelin.¶ One of the synonyms cited under *P. angulata* both by Linnaeus and Nees is "Alkekengi indicum glabrum chenopodiifolio. Dill. Elth. p. 13, t. 12, f. 12;" which figure gives a fair representation of the plant now known as *P. angulata Linkiana* (Nees) Gray.** Furthermore, the leaves of that plant resemble those of *Chenopodium viride*, a statement that can scarcely be made with reference to *P. obscura* Michx. In my opinion *P. Linkiana* Nees is the true *P. angulata*. Dunal, in De Candolle's Prodrômus,†† corrects Nees, stating that *P. obscura* Michx. is not a synonym of *P. angulata* L., but makes a mistake when he refers the former to his own species *P. hirsuta*,‡‡ that is to *P. pubescens* L. He retains *P. angulata* and *P. Linkiana* as two distinct species, while Gray makes the latter a variety of the former. Hemsley, in *Biologia Centrali Americana*, regards *P. Linkiana* as a synonym of *P. angulata*.

Physalis pubescens L.§§ and *Physalis pruinosa* L.|||| are included in one species by Nees and Gray, although the former recognizes *pruinosa* as a variety. There are, however, two distinct species in the United States which might claim the name *P. pubescens*, one diffuse, with small thin ovate leaves, which are sub-entire at least at the base; the other more or less erect, with large thicker leaves, which are coarsely sinuate-dentate and somewhat resemble those of *P. heterophylla* Nees. The former I take as *P. pubescens* L., the

* L. Sp. Pl. 183, 1753.

† Michx. Fl. Bor. Am. 1: 149. 1803.

‡ Linnæa, 6: 474. 1831.

§ Linnæa, 6: 471. 1831.

|| Link, Enum. Hort. Berol. 1: 181. 1821.

¶ See foot note, Linnæa, 6: 471. 1831.

** Proc. Am. Acad. 10: 64. 1874.

†† DC. Prod. 13: pt. 1, 449. 1852.

‡‡ DC. Prod. 13: pt. 1, 445. 1852.

§§ L. Sp. Pl. 183. 1753.

|||| L. Sp. Pl. 184. 1753.

latter as *P. pruinosa*. The whitish pubescence often found on the latter looks at a distance somewhat like mealiness, which, perhaps made Linnaeus give it the characters "divaricationibus farinaceo-germinantibus." It sometimes has yellow anthers, which is given as a character by Linnaeus. The view taken here is practically that held by Nees,* although I think that *P. pruinosa* deserves specific rank. Dunal, as far as I can judge, confuses the two, as his description of *P. pubescens* fits rather that of *P. pubescens* β . Nees, † which, according to Nees, is the same as *P. pruinosa* L. Yet he cites under it as a synonym *P. pubescens* α Nees (*P. pubescens* L.). He describes a species under the name *P. hirsuta*, ‡ and as varieties of this he places *P. pubescens* β . Nees, (*P. pruinosa* L.), and *P. Barbadosensis* Jacq., § but his description corresponds with that of *P. pubescens* α . Nees. It is evident that Dunal has confused *P. pubescens* L. and *P. hirsuta* Mart. & Gal., || a Mexican species not found at all within the United States. The characters by which it differs from *P. pubescens* are given in Walp. Rep. 6: 574, viz., the long setaceously acuminate calyx-lobes.

What makes me think still more that *P. hirsuta* Dunal is the true *P. pubescens* L. is that it is the species dispersed throughout the warmer regions of the world, while *P. pubescens* Dunal is, as far as I know, restricted to North America. The locality given by Linnaeus for *P. pubescens* is "India utraque," and for *P. pruinosa*, "America."

Another species found within the United States and often confused with the two preceding is one recently collected in Missouri, Kansas, etc. It differs in the shorter calyx lobes. Dr. Britton has named it *P. minima* L, and regards it as introduced. Very likely the identification is right, or rather it is the plant that has been known by this name. At least it is nearly related to it. The description of *P. minima* L., however, ¶ does not fit it at all. The characters given, "Physalis ramosissima pedunculis fructiferis folio longioribus," could only be applied to one American

* Linnaea, 6: 467-8. 1831.

† Linnaea, 6: 467. 1831.

‡ DC. Prod. 13: pt. 1; 445. 1852.

§ Jacq. Misc. 2: 259. 1781.

|| Mart. & Gall. in Bull. Brux. 12: Part 1, 132. 1845.

¶ L. Sp. Pl. 183. 1753.

annual species, viz., *P. Greenei* Vasey & Rose* (*P. pedunculata* Greene†, not Mart. & Gal.‡). It is impossible that Linnaeus had this rare plant from Lower California, which therefore can not be *P. minima*. The Linnaean species was from India. Both the locality and the characters given above make it impossible that our plant is *P. minima*, unless a serious error is made in the original description.

Nees suggests that the statement that the pedicels of the fruiting calyx are longer than the leaves may be a typographical error, and perhaps meant longer than the petioles of the leaves. In Miller's Dictionary§ *P. minima* is thus characterized. But even then our species does not agree with the description, as the pedicels are generally much shorter than the petioles. If *P. minima* of Linnaeus and that of Miller are the same, the name *P. minima* does not belong to our species, as *P. minima* of Miller is a smooth plant and generally regarded as the same as *P. Indica* Lam.|| The first synonym cited by Linnaeus under *P. minima* is "Solanum vesicarium indicum minimum Herm. Lugb. 569, pl. 571." This according to Nees, is also glabrous and is by him included in *P. Indica*. Dunal in DC. Prodr. makes it the type of a new species, *P. Hermannii*.¶ Probably it is only a form of *P. Indica* Lam., but is the one that has the right to be called *P. minima* L., unless the type specimens in the Linnaean herbarium, if there are any, show that this species is something else. Anyhow, *our* species has no right to the name. From the description of *P. parviflora* R. Br. in De Candolle's Prodr.,** it seems as if it were that species, but the original description in Robert Brown's Prodr. Novae Hollandiae†† is different, and *P. parviflora* R. Br. is now generally regarded as a form of *P. Indica* Lam. *P. parviflora* Lagasca‡‡ is the same as *P. minima*, not of Linnaeus, but as that species has

* Cont. U. S. Nat. Herb. 1: 18. 1890.

† Pittonia, 1: 268. 1889.

‡ Bull. Acad. Brux. 12: pt. 1, 132. 1845.

§ 8th Edition, no. 11. 1768.

|| Lam. Encycl. 2: 102. 1786.

¶ DC. Prodr. 13: pt. 1, 444. 1852.

** DC. Prodr. 13: pt. 1, 445. 1852.

†† R. Br. Prodr. Nov. Holl., 447. 1810.

‡‡ Lag. Gen. & Sp. 11. 1816.

been understood by Nees, Dunal, etc. As *P. parviflora* Lagasca is antedated by that of Robert Brown, we have to use the name *P. Lagascae* R. & S.* for our species, unless it turns out to be a new one.

In the appendix to the second edition of *Species Plantarum*,† Linnaeus describes two more species, viz: *P. Pennsylvanica* and *P. Peruviana*, both American. Nothing need be said about the identity of the latter, as it is now well understood. According to Nees there is a specimen of this in the Linnaean herbarium labelled *P. pubescens*. Perhaps this was the reason why Robert Brown ‡ describes specimens of *P. Peruviana* under this name. Forms of this wide-spread species have been described under several names, as *P. esculenta* Willd., *P. tomentosa* Medic., *P. tuberosa* Zuccagni. *P. latifolia* Lam., *P. edulis* Sims, *P. Barbadosensis* Lam. The name *P. Peruviana* has also been used erroneously by Roxburgh for *P. pubescens* and by Wallroth for *P. angulata*.

P. Pennsylvanica has caused much trouble, and the name has been applied to *P. Virginiana* Mill., *P. heterophylla* Nees, *P. Philadelphica*, *P. viscosa*, etc. The Linnaean description certainly does not help to identify it. There are only two American species that have the berry as small as the size of a pea, viz: *P. microphysa* Gray and *P. Carpenteri*.§ The first is a rare plant from Mexico; both are so different from others that no confusion is possible. In neither are the leaves smooth above and puberulent beneath. There are forms of *P. Virginiana* Mill.,|| not Gray, ¶ (*P. lanceolata* Gray,** not Michx. ††) and *P. arenicola* Kearney, ‡‡ that sometimes have leaves smooth above and slightly hairy beneath, especially on the veins, but both have berries of the size of a garden cherry and the pubescence cannot be called puberulent. The former and also forms of *P. Philadelphica* and *P. longifolia* Nutt. §§ are often found,

* R. & S. Syst. 4: 679. 1819.

† L. Sp. Pl. Ed. 2: 1670. 1762.

‡ R. Br. Prodr. Nov. Holl, 447. 1810.

§ See below.

|| Mill. Gard. Dict. Ed. 8, no. 4. 1768.

¶ Gray, Syn. Fl. 2: pt. 1: 235. 1878.

** Proc. Am. Acad. 10: 67. 1874.

†† Michx. Fl. Bor. Am. 1: 149. 1803.

‡‡ Bull. Torr. Club, 21: 485. 1894.

§§ Trans. Am. Phil. Soc. (II.) 5: 193. 1833-37.

even in our largest herbaria, labelled *P. Pennsylvanica*. I suppose this is so because Dr. Gray used that name in the fifth edition of his Manual for the complex species which he afterward called *P. lanceolata*.* From the description one would think that *P. Pennsylvanica* were one of the forms there included, rather than a form of *P. viscosa*. But as such careful workers as Nees and Dunal, and Gray in his later years, classed *P. Pennsylvanica* among the stellate species, either as a form of *P. viscosa* or as a species nearly related to it, I shall also leave it there, especially as I have seen at Harvard University, a tracing of the specimen in the Linnaean herbarium. It resembles a small-leaved form of *P. viscosa* and a note in pencil states that the pubescence is stellate. This does not agree with the Linnaean description which gives it as pruinose. The real nature of the pubescence of *P. viscosa* is hard to make out with the naked eye and Linnaeus states somewhere that he could not work with "*oculis armatis*." This may be the reason why he called the pubescence pruinose instead of stellate.

In the eighth edition of Miller's Gardeners' Dictionary, 1768, there are several species named and described. Except those mentioned above, I do not know that there are any of interest to us, except *P. Virginiana*.† Most authors regard it as synonymous with *P. lanceolata* Michx.,‡ others as the same as *P. Pennsylvanica* L., probably because both have been misunderstood and confused. Dr. Gray adopted the name *P. Virginiana* for the common broad-leaved, viscid perennial, which should be known as *P. heterophylla* Nees.§ He gives the reason for so doing in the Synoptical Flora|| where we read: "This early name of Miller, taken up for the present species in Proc. Am. Acad., *l. c.*, must from the size of the flower belong to it, or to a broad-leaved and hairy form of *P. lanceolata*. Miller's remark that the root does not creep in the ground is most applicable to the latter; but the color, as well as the size of the corolla and the 'pale yellow' fruit, also the diffuse growth, best accord with this common species." From this it may be seen that Dr. Gray was not certain that he applied the name

* Proc. Am. Acad. 10: 67. 1874.

† Mill. Gard. Dict. Ed. 8, no. 4. 1768.

‡ Michx. Fl. Bor. Am. 1: 149. 1803.

§ Linnaea, 6: 463. 1831.

|| Gray, Syn. Fl. 2: pt. 1, 235. 1878.

to the right species. Had he referred it to a broad-leaved and hairy form of *P. lanceolata* Michx., as he understood the same, he would have done the right thing. But evidently Dr. Gray had never seen this form exactly like the figure in Miller's Illustrations, *plate 206. f. 1.* As far as I can remember, there are no specimens of it in the Gray Herbarium. I have had for study all the important collections of *Physalis* in the United States. In all, it is represented by specimens from only a dozen localities and all collected since 1886. It is, therefore, easy to find an excuse for Dr. Gray's erroneous application of the name *P. Virginiana*. All forms of *P. Virginiana* Miller or *P. lanceolata* Gray* have a thick more or less fleshy and erect caudex, while *P. heterophylla* Nees (*P. Virginiana* Gray) generally has a slender creeping rootstock. As far as the size and color of the corolla is concerned there is no constant difference between them, both being very variable. The only character not agreeing with *P. lanceolata* Gray, as described in the Synoptical Flora, is the color of the fruit, but this varies in several species, and why not in this also. *P. lanceolata* Gray will therefore become *P. Virginiana* Miller. It represents the most common form of that species.

Physalis Philadelphica † is not very well understood. In our herbaria we find specimens under this name that belong to widely distinct species, viz: forms of *P. angulata* L., and of *P. aequata* Jacq., ‡ fruiting specimens of *P. Alkekengi* or *P. Virginiana* Mill and even of *P. Carpenteri*. § As I understand *P. Philadelphica* Lam., it is a species nearly related to *P. longifolia* Nutt., || but with broader leaves. It is as often perennial as annual (the original description says annual), but is the only species of the eastern United States that fits the description of *P. Philadelphica* at all, except *P. aequata* Jacq., which, however, is not a native, but recently introduced. In describing *P. longifolia*, Nuttall states that it is nearly related to *P. chenopodifolia*. Evidently he meant *P. chenopodifolia* of Willdenow, ¶ and not that of Lamarck.**

* Gray, Proc. Am. Acad., 10: 67. 1874.

† Lam. Encycl. 2: 101. 1786.

‡ Nees in Linnæa 6: 470. 1831.

§ See below.

|| Trans. Am. Phil. Soc. II., 5: 193. 1833-37.

¶ Willd. Sp. Pl. 1: 1023. 1798.

** Lam. Ill. 2: 28. 1793.

The former has always been regarded as a synonym of *P. Philadelphica* Lam. Lamarck cites Miller's figure 1, plate 206, but as stated before this is *P. Virginiana*. Undoubtedly he only looked at the figure without reading the description. Miller describes his plant as perennial and hairy, Lamarck his as annual and glabrous. As far as Miller's figure is concerned it might as well represent one as the other. One thing that has caused much confusion, is that *P. Philadelphica* is generally described as the only species in which the berry fills and even bursts the calyx, a character that is far from constant, and also found in *P. longifolia* Nutt., and still more common in *P. aequata* Jacq. The character is not given in the original descriptions of either *P. Philadelphica* Lam. or *P. chenopodifolia* Willd. It is given in the original description of *P. ovata* Poir.,* which has been regarded as a synonym of *P. Philadelphica* Lam. To me it seems more likely to be a synonym of *P. aequata*. As far as this latter is concerned, it is rightly understood and the plant agrees perfectly with Jacquin's description and plate,† but unfortunately there is an older name *P. isocarpa* Brot., described in Hornem. Hort. Hafn, and the species must take that name.

N. J. Jacquin described *P. Barbadosis*‡ in 1781. It is nearly related to *P. pubescens* and *P. pruinosa*, and has been regarded as a variety of the former species. It differs from it in its erect habit, its larger, more cordate and more toothed leaves, and its larger, more elongated fruiting calyx. It was based on Dillenius' figure of "*Solanum Barbadosense nanum Alliariae folio*," which is cited by Linnaeus as a synonym under *P. pruinosa* in the second edition of *Species Plantarum*. Elliott, therefore, adopted the name *P. pruinosa* for *P. Barbadosis*. The reference is, however, not found in the first edition of *Species Plantarum*, and according to Dunal, and others, Linnæus erred when he referred Dillenius' plant to his species *P. pruinosa*. *P. Barbadosis* is well distinct from *P. pruinosa*, but differs from *P. obscura* Michx. § in no other respect than in its hairiness. The two are but one species.

* Poir., in Lam. Encycl. Suppl. 2: 347. 1811.

† Jacq. f. Eclog. 2: pl. 137. 1844.

‡ Jacq. Misc. 2: 359. 1781.

§ Michx. Fl. Bor. Am. 1: 149. 1803.

Michaux describes also *P. obscura viscido-pubescentis*, which must be *P. Barbadosis* Jacq. or perhaps *P. pruinosa*.

What *P. lanceolata* Michx.* is, is hard to determine. It should be a perennial species from North Carolina, with lanceolate, subentire and subsessile leaves and hirsute calyx. No species has, as a rule, subsessile leaves, but the other characters fit two different plants. One is a rare plant from the Southern States, Florida, Alabama, etc. It has thin subentire leaves, but otherwise resembles most *P. Virginiana*, but with the pubescence of the stem somewhat viscid, and in this respect approaches *P. heterophylla* Nees. The other one, for which I adopt the name *P. lanceolata*, resembles much *P. pumila* Nutt.† (*P. lanceolata hirta* Gray‡), except that it lacks the branching of the hairs on the lower surface of the leaves. It differs from *P. Virginiana* Miller (*P. Pennsylvanica* Gray§ and *P. lanceolata* Gray|| mainly, as to the description) in the fruit, which is greenish yellow, not reddish; in the fruiting calyx, which is scarcely angled and scarcely sunken at all at the base; and in the leaves, which are thicker, dark green, and with entire margins. Although Dr. Gray rather describes *P. Virginiana* in his Synoptical Flora, he evidently regarded this form as the typical *P. lanceolata* Michx., as he names it in his Manual, 5th edition, *P. Pennsylvanica lanceolata*¶. At first I doubted very much that it was the true *P. lanceolata* Michx., as it is mainly a western species, principally found west of Mississippi, but I found afterwards specimens collected by Ravenel in both North and South Carolina.

Physalis lanceolata, as treated by Gray in the Synoptical Flora, comprises with its varieties not less than six, or perhaps rather seven, distinct species, viz.:

1. *P. Virginiana* Mill (*P. Pennsylvanica* Gray, Man., 5th edition, and *P. lanceolata* Gray, Synoptical Flora, mainly).

2. *P. arenicola* Kearney.**

* Michx. Fl. Bor. Am. 1: 149. 1803.

† Trans. Am. Phil. Soc. (II.) 5: 193. 1833-37.

‡ Proc. Am. Acad. 10: 68. 1874.

§ Gray, Man. Ed. 5, 382. 1867.

|| Proc. Am. Acad. 10: 67. 1874.

¶ Gray, Man. Ed. 5, 382. 1867.

** Bull. Torr. Club, 21: 485. 1894.

3. *P. lanceolata* Michx. (*P. Pennsylvanica lanceolata* Gray, Man., 5th edition).

4. *P. pumila* Nutt. (*P. lanceolata hirta* Gray*).

5. *P. longifolia* Nutt.† (*P. lanceolata laevigata* Gray‡).

6. *P. macrophysa* Rydberg.§

7. An undescribed Texan species, nearly related to *P. longifolia* and characterized in this paper.

In 1827 Dr. Torrey described *P. lobata*||. Dr. Gray states ¶ that *Solanum luteiflorum* Dunal,** or at least the var. *subintegri-folium* is the same, but this is a mistake. The description does not fit *P. lobata* at all. There is a poor specimen, without flower and fruit, of the variety in the Torrey Herbarium at Columbia College, and another at Harvard from the original collection. Although they resemble somewhat *P. lobata* in the form of the leaves, etc., they may just as well belong to *Chamaesaracha*, as, for instance, a form of *C. Coronopus* Gray.†† Dunal in De Candolle's Prodrômus places *Solanum luteiflorum* next before *S. Coronopus*, which is the same as *Chamaesaracha Coronopus* Gray.

In the addenda to the Synoptical Flora, Gray also refers *Chamaesaracha physaloides* Greene ‡‡ to *P. lobata*, which is another mistake. The former is Gray's own *Physalis Wrightii* §§ as shown by the type, which is only a better developed specimen than Gray's.

Nuttall describes five new species, viz: *P. angustifolia* and *P. Walteri* in the Journal of the Academy of Philadelphia,||| and *P. pumila*, *P. longifolia* and *P. mollis* in the Transactions of the American Philosophical Society. *P. angustifolia* and *mollis* are known under their respective names. *P. Walteri* is *P. viscosa* L.¶¶ as

* Proc. Am. Acad. 10: 68. 1875.

† Trans. Am. Phil. Soc.(II.) 5: 193. 1833-37.

‡ Proc. Am. Acad. 10: 68. 1874.

§ Bull. Torr. Club, 22: 308. 1895.

|| Ann. Lyc. N. Y. 2: 226. 1827.

¶ Gray, Syn. Fl. 2: pt. 1, 233. 1878.

** DC. Prodr. 13: pt. 1, 64. 1852.

†† Bot. Cal. 1: 540. 1876.

‡‡ Bull. Torr. Club, 9: 122. 1882.

§§ Proc. Am. Acad. 10: 63. 1874.

|| 7: 112-113. 1834.

¶¶ 5: 193-4. 1833-37.

stated before. *P. longifolia* is the same as *P. lanceolata laevigata* Gray, but is a good species and should be known by its Nuttallian name. *P. pumila* is cited by Gray as a synonym of *P. lanceolata*, but Nuttall's type specimen in the herbarium of the Philadelphia Academy of Sciences, shows that it is the same as *P. lanceolata hirta* Gray. In the "New Check List"* it bears the name *P. cinerascens* (Dunal) Hitchcock,† with the synonym *P. Pennsylvanica cinerascens* Dunal.‡ This is simply an incorrect identification, as *P. mollis cinerascens* (Dunal) Gray § does not grow in Kansas.

In 1831 Nees ab Esenbeck published his revision of *Physalis* in Linnæa.|| This excellent work seems to have served as the foundation for Gray's revision in the Proc. Am. Acad. 10: 62-68. Gray follows Nees closely, but, as far as I can find, does not give him credit anywhere. The following new North American species are described: *P. heterophylla*, *lanceifolia* and *Linkiana*. *P. heterophylla* and *Linkiana* have been discussed before. *P. lanceifolia*¶ is mainly Mexican, but forms belonging to it come within the United States. Specimens collected by Schott and Thomas, and referred doubtfully to *P. Wrightii* by Gray,** belong here. It is nearly related to *P. Wrightii* and *P. angulata*, but has much smaller flowers. Specimens under the name *P. lanceifolia* Nees, collected by Rügél at the mouth of St. Mark's River, Florida, have caused much trouble, and several new species have been proposed for the same. The cause of the confusion can easily be seen. The original distribution contains at least three distinct species. The specimens preserved in the Engelmann Herbarium represent two, one annual, a form of *P. lanceifolia* Nees, but with narrower leaves, and one perennial, a form of *P. Virginiana* Mill. In the Columbia College Herbarium it is represented by specimens exactly like the original specimens of *P. Pennsylvanica spathulæfolia* Torr.†† It

* List of Pteridophyta and Spermatophyta, growing without cultivation, in North-eastern North America, in Memoirs of the Torrey Botanical Club, Vol. V.

† Hitchcock, Spring. Fl. Manh. 32. 1894.

‡ DC. Prod. 13: pt. 1, 435. 1852.

§ Proc. Am. Acad. 10: 66. 1874.

|| Vol. 6: 431-483. 1831.

¶ Linnæa, 6: 473. 1831.

** Proc. Am. Acad. 10: 63. 1874.

†† Torr. Bot. Mex. Bound. 153. 1859.

was on these specimens of *P. lanceifolia*, at least in part, that Kunze based his *P. Elliottii*.* It is so indicated on the label. His description agrees, except to the pubescence of the calyx, which must have been taken from the specimens of *P. Virginiana*. The name *P. viscosa spathulaefolia* has therefore to give away to *P. Elliottii*, which is the older. Kunze thinks that it may be *P. lanceolata* Ell. It might possibly be so (I have not seen Elliott's specimens); but from the original description, and according to Dr. Gray, who had seen Elliott's herbarium, this is a form of *P. viscosa*.

Gray included in his *P. viscosa spathulaefolia*,† also narrow-leaved forms of *P. viscosa* L. They are, so far as I can judge, what Nees and Dunal regarded as *P. Pennsylvanica* L. but this is, as stated before, only a small-leaved form of *P. viscosa* proper. The only available name is *P. maritima* Curtis. In the original description, Curtis gives only one synonym, viz.: *P. pubescens* Engel. & Gray, Pl. Lindh. and Lindheimer's specimens belong to this variety of *P. viscosa*. It will be known as *P. viscosa maritima* (Curtis).

In 1874, Dr. Gray published his revision of the genus in the Proc. American Academy. Here three species and several varieties are described. The species are *P. Wrightii*, *P. hederæfolia* and *P. Fendleri*. A few remarks on *P. Wrightii* were made under *P. lobata*. *P. hederæfolia*‡ and *P. Fendleri* are also good species. The name of the former has been changed in the "New Check List" to *P. digitalifolia* (Torr.) Britton.§ The change, however, was unwarranted. It is true that it is the same as *P. Alkekengi?* var. *digitalifolia* Torr.,|| but this was simply a wrong identification. Dr. Torrey believed that it was *P. Alkekengi digitalifolia* Dunal.¶ Dr. Gray also held that the identification was erroneous as he gives as a synonym under *P. hederæfolia*, *P. Alkekengi?* var. *digitalifolia* (vix. Dunal) Torr. l. c.

In the Synoptical Flora, Dr. Gray adds *P. Palmeri*** I have

* Linnaea, 20: 33. 1847.

† Proc. Am. Acad. 10: 67. 1874.

‡ Proc. Am. Acad. 10: 65. 1874.

§ Mem. Torr. Bot. Club, 5: 288. 1894.

|| Torr. Mex. Bound. Surv. 153. 1859.

¶ DC. Prod. 13: pt. 1, 438. 1852.

** Gray, Syn. Fl. 2: pt. 1, 235. 1878.

the type specimens as a loan from Harvard and they show that it is nothing but a form of *P. hederæfolia* with the pedicels slightly longer than usual. It scarcely deserves varietal rank.

In a note just before *P. grandiflora*, Dr. Gray writes:* “*P. Carpenteri* Riddell, Cat. Fl. Ludov. (N. O. Med. and Surg. Journal 8: 758, 1852, name only), referred to *Withania Morisoni* in Bot. Gazette, 3: 11, is some adventitious *Athenaea*.” In the collections there are about half a dozen specimens from Louisiana, Alabama and Florida. It is plain that it is not *Withania Morisoni* Dunal.† It is not an *Athenaea*, as characterized by Bentham & Hooker or Dunal, as the corolla is not divided to or below the middle and its lobes are not valvate. It has the corolla of *Physalis*. The calyx is inflated, as in that genus, but not angled, in the original specimens often with very unequal lobes. The latter characters and the fact that the flowers are in fascicles seem to throw it out of *Physalis* and into *Athenaea*. But in *P. Wrightii* Gray, the flowers are sometimes found in twos, threes or even fours, and in specimens of *P. Carpenteri* of later collections, as, for instance, Nash, no. 2503, the calyx-lobes are short and equal and the flowers solitary. I have compared the present species with *P. leptophylla* Robinson & Greenman,‡ which is without doubt a *Physalis*, and the latter differs in no respect except that the flowers are always solitary, somewhat smaller, the lobes of the calyx equal, and the fruiting calyx a little larger and of somewhat firmer texture. I regard, therefore, *P. Carpenteri* as a *Physalis*, but what name shall it receive and how shall it be cited? *Physalis Carpenteri* Riddell, in Cat. Fl. Ludov. is a nomen nudum. In the Botanical Gazette, Dr. Chapman describes it under *Withania Morisoni*, but it is not *W. Morisoni* Dunal. The description is not long, but well characterizes the plant. *Physalis Carpenteri* Riddell, is given as a synonym. So here is a description and a name, hence a publication, and it should be cited: *Physalis Carpenteri* Riddell; Chapman in Bot. Gaz. 3: 11, 1878, as a synonym under *Withania Morisonii* Chapman, not Dunal.

A few changes are also here proposed in the limitations of

* Syn. Fl. 2: pt. 1, 233. 1878.

† DC. Prod. 13: pt. 1, 454. 1852.

‡ Proc. Am. Acad. 29: 389. 1894.

genera. *Physalis grandiflora* Hook is made the type of a new genus. It rather belongs to *Chamaesaracha* than to *Physalis*. It lacks the essential characters of the latter. The fruiting calyx is neither angled, nor ten-ribbed, nor reticulate. It is thin, indistinctly veined, closely fitting to the fruit and open at the mouth. The only floral character which differs from *Chamaesaracha nana* is the length of the calyx-lobes, which much exceed the fruit. The corolla of *P. grandiflora* is that of a *Chamaesaracha*, *i. e.*, widely rotate and white, or sometimes tinged with purple. In *Physalis* the corolla is open-campanulate rather than rotate and with a few exceptions more or less yellow. Evidently *P. grandiflora* should be removed from *Physalis*. As it is so nearly related to *Chamaesaracha nana* (differing, as I thought, principally in the length of the calyx), I transferred it at first to that genus, but have decided at last to make it the type of a new one. I have so decided mostly from the fact that the calyx is at first somewhat inflated, a character never found in *Chamaesaracha*. This is not seen in herbarium specimens, but my authority is Prof. C. F. Wheeler, of Michigan Agricultural College, who knows the plant in the field.

Physalis lobata is also taken out of the genus. It comes nearer to *Chamaesaracha* than to *Physalis* in every respect except in the fruiting calyx. It differs however from both genera in the structure of the seeds, in the color and form of the corolla and in being somewhat fleshy. It is the type of a distinct genus.

If two more of the species, *P. microphysa* and *P. Alkekengi* could be also removed, the genus would be a very natural one. In the former the fruiting calyx is nearly that of an *Athenaea*, while the corolla is of a true *Physalis*. In *P. Alkekengi*, the corolla is whitish and much deeper cleft. If held distinct from *Physalis*, it would together with *P. Sendtneri* constitute a genus (*Megista* Tourr.) of European origin, while *Physalis* proper is principally American.

The genera included in the monograph all belong to the tribe

Solaneae: Corolla (mostly short) with regular limb plicate or valvate in the bud, usually both, *i. e.*, the sinuses or what answers to them plicate and the edges of the lobes induplicate. Stamens (normally 5) all perfect. Fruit baccate or at least indehiscent,

sometimes nearly dry. Seeds flattened; embryo curved or coiled, slender, the semiterete cotyledons not broader than the radicle.*

1. Anthers unconnected, destitute of terminal pores, dehiscent longitudinally.
a. Fruiting calyx bladdery-inflated, 5-angled and deeply 5-parted; ovary 3-5-loculed. (*Physalodes*.)

b. Fruiting calyx bladdery-inflated, 5-lobed, but not parted, 10-costate and often 5-10-angled, reticulated, wholly enclosing the berry, lobes mostly connivent; ovary 1-loculed.

Corolla yellowish or greenish, often tinged with violet, urceolate, minutely toothed on the more or less contracted orifice. *Margaranthus*.

Corolla open-campanulate, yellowish or whitish, often with a dark center; seeds with a thin margin, finely pitted. *Physalis*.

Corolla flat-rotate, violet or purple; seeds thick, rugose-tuberculate. *Quincula*.

c. Fruiting calyx somewhat enlarged, but closely fitted to the fruit, thin, obscurely veiny, open at the mouth.

Corolla rotate, whitish; lobes of the fruiting calyx much exceeding the berry.

Leucophysalis.

Corolla rotate, whitish sometimes tinged with purple; fruiting calyx not exceeding the berry. *Chamaesaracha*.

Corolla tubular, ochroleucous or purplish.

Oryctes.

d. Fruiting calyx enlarged, rotately expanding under the fruit.

(*Saracha*).

e. Fruiting calyx not much enlarged, generally small.

(*Capsicum*, *Salpichroa*, etc.).

2. Anthers connate or connivent, either tipped with an empty acumination or with an apical pore.

(*Lycopersicum*, *Solanum*, etc.).

1. *Margaranthus* Schlecht.

Margaranthus Schlecht. Ind. Sem. Hort. Hal. 1883.

Annual smooth or slightly strigose, divergently branched herbs, much resembling *Physalis* in habit. Calyx campanulate, 5-toothed, in fruit enlarged and inflated, ribbed and reticulate, inclosing the rather dry berry. Corolla urceolate, from a narrow cylindrical base, expanding above the calyx and more or less contracted at the orifice, minutely 5-toothed. Stamens inserted at the upper end of the tubular portion, with short filaments, more or less connivent and included in the corolla, opening by 2 longitudinal slits. Style slightly exerted; stigma entire. Seeds numerous, flattened, kidney-shaped, minutely tubercled.

Corolla urceolate, much constricted at the orifice, very saccate, sinuses between the lobes narrow; anthers long, slightly tapering upward. 1. *M. tenuis*.

Corolla urceolate, less constricted at the orifice, less saccate; sinuses broad and shallow; anthers shorter, oblong; calyx about $\frac{1}{2}$ the length of the corolla, in fruit about 8 mm. in diameter. 2. *M. solanaceus*.

* These characters of the tribe are taken from Gray, Syn. Fl. 2: part 1, 224.

Corolla as in preceding, but tubular portion longer; anthers oblong; calyx larger, fully $\frac{2}{3}$ the length of the corolla, in fruit 12–15 mm. in diameter.

3. *M. purpurascens*.

Corolla campanulate-urceolate, little if at all constricted at the orifice.

4. *M. Lemmoni*.

1. *Margaranthus tenuis* Miers, Ill. S. A. Pl. 2: 74. *pl.* 57. 1849–57;
Dunal, in DC. Prod. 13: part 1, 685.

Stem very slender, sharply angled, divaricately branched, glabrous or the upper parts slightly strigose with short hairs; leaves lanceolate, membranaceous, long-acuminate, subentire or sometimes few-toothed, tapering into a slender petiole; the short peduncles and calyx strigose; the latter campanulate, less than half the length of the corolla, its lobes short, broadly triangular; corolla urceolate, obtusely 5-angled, considerably saccate, much constricted at the orifice so that the orifice is narrower than the short cylindrical tube below, yellowish, with the sacs and the teeth tinged with purple; teeth lanceolate, divergent, the sinuses between them narrow; anthers long, half as long as the corolla, tapering upward; fruiting calyx round-ovoid, about 10 mm. long and 8 mm. in diameter.

Gray includes *M. tenuis* in *M. solanaceus*, but a comparison between Miers' figures of the first and Schlechtendal's plate of the second, is only needed to show that the structure of the flower is very different. The herbarium specimens show the same characters.

The specimens of *M. tenuis* from the original collection, the only ones I have seen, are much more slender than any of *M. solanaceus* and have much narrower leaves.

Mexico: Coulter, no. 1220. (Type).

2. *Margaranthus solanaceus* Schlecht. Ind. Sem. Hort. Hal. 1838; *Linnaea*, 13: litt. 99. (1839); Dunal, in DC. Prod. 13: part 1, 453; Gray, *Syn. Fl.* 2: part 1, 237; Hemsley, *Biol. Cent. Am.* 2: 24; Torr. *Bot. Mex. Bound.* 154; Coult. *Cont. U. S. Nat. Herb.* 2: 301.

Stem slender, more obtusely angled, divaricate, slightly strigose or glabrous; leaves membranaceous, ovate or ovate-lanceolate, subentire or repandly few-toothed; peduncels short, strigose; calyx campanulate, about half the length of the corolla, its lobes broadly triangular; corolla yellowish, tinged with purple, upper portion nearly spherical, slightly saccate, less constricted at the orifice; teeth very small, sinuses between them very broad and

shallow; anthers about one-fourth the length of the corolla, oblong, not tapering upward; fruiting calyx round-ovoid, of about the same size as in the preceding.

Dr. Gray includes in this, Berlandier's no. 2277, which Dunal refers to *Physalis divaricata*. These specimens do not belong to *M. solanaceus*, as they differ both in habit and leaves. There are two sheets from the original collection in the Torrey Herbarium and neither in flower. It is doubtful to which genus they belong. Very likely Dunal's determination was correct. *M. solanaceus* occurs from Texas to Arizona and Mexico. Specimens examined:

New Mexico: Bigelow, 1851 (Mex. Bound. Surv.); C. Wright, no. 1603, 1851-2; H. H. Rusby, no. 307, 1881 (in part).

Arizona: T. E. Wilcox, 1883.

Mexico: C. G. Pringle, no. 1079, 1886; no. 342, 1885.

3. *Margaranthus purpurascens* n. sp.

Stouter than the preceding, which it resembles; leaves broadly lanceolate, acuminate, thin, subentire, tapering into a slender petiole; peduncles very short; calyx campanulate-cylindrical, much larger than in the preceding, fully two-thirds the length of the corolla, lobes short-triangular; corolla yellowish, tinged with purple, with longer cylindrical portion; upper portion not fully as round as in the preceding, more tapering upward, but not as much constricted as in *M. tenuis*; lobes short, sinuses broad and shallow, anthers less than one-fourth the length of the corolla, oblong; fruiting calyx ovoid, 15-20 mm. long and 12-15 mm. in diameter, generally purplish at the base and purple-veined.

It differs from the preceding mainly in the stouter habit, in the form of the corolla, and in the form and size of the calyx.

Type specimens:

New Mexico: H. H. Rusby, no. 307, 1881. (mainly).

4. *Margaranthus Lemmoni* Gray, Proc. Am. Acad. 19: 91. 1883; Syn. Fl. 2: part 1, 437.

Very much branched and decumbent, more leafy than *M. solanaceus* which it much resembles; leaves entire; calyx campanulate, teeth half as long as the tube; corolla white, campanulate-urceolate, scarcely constricted at the orifice, which is obtusely 5-lobed; fruiting calyx as in *M. solanaceus*.

The only specimens extant, as far as I know, are those of the original collection, which I hastily looked at, while studying the

genus *Physalis* at Harvard University. They seemed to me scarcely distinguishable from *M. solanaceus*, except in the form of the corolla, which approaches that of *Physalis* in form. Perhaps it is only a form of *M. solanaceus*.

Arizona: Cave Cañon, Lemmon.

2. *Physalis* L.

PHYSALIS L. Sp. Pl. 183. 1753.

ALKEKENGI Tourn.; Adans. Fam. Pl. 2: 218. 1763.

HERSCHELLA Bowdich, Excurs. Mader. 159. 1825.

ALICABON Raf. Sylva Tell. 56. 1838.

MEGISTA Tourr. in Ann. Soc. Linn. (II) 17: 115. 1869.

Annual or perennial herbs, sometimes a little woody below, with entire or sinuately toothed leaves. Peduncles slender, generally solitary from the axils of the leaves, but sometimes (as for instance in *P. Wrightii* and *P. Carpenteri*) in fascicles of 2-4. Calyx campanulate, 5-toothed, in fruit enlarged and bladdery-inflated, membranaceous, 5-angled or prominently 10-ribbed and reticulate, wholly inclosing the pulpy berry; teeth in most cases connivent. Corolla yellowish or whitish, often with a darker, brownish or purplish center, openly campanulate or rarely campanulate-rotate, plicate, with very short and broad lobes which are slightly imbricate in the bud. Stamens inserted near the base of the corolla; anthers oblong, opening by a longitudinal slit. Style slender, somewhat bent; stigma minutely 2-cleft. Seeds numerous, kidney-shaped, flattened, with a thin edge, finely pitted.

Physalis is principally an American genus. One section (*Megista*), consisting of two species, is of European origin, and about half a dozen are natives of India and Australia. The rest are American,* although several have been introduced into the Old World and Australia. The number of recognized species is about 50. The actual number is, however, much larger as there are many yet to be described. Mexico is especially rich in species and of those native to that country perhaps more than one-half remain unnamed.

* Photographs, one half natural size, have been taken of all North American species and varieties of *Physalis* except *P. Texana* and *P. Neo-Mexicana*. In some cases interesting forms have been added. What makes the set more valuable is that it includes the photographs of all type specimens preserved in American herbaria, except that of *P. angustifolia*, which is a mere fragment. The photographs number about 60, and may be had at about 15 cents each, either from Dr. Chas. E. Bessey, University of Nebraska, or from the author.

§. 1. EUPHYSALIS. Flowers yellowish, often with a dark center, limb only slightly 5-lobed, pentagonal in outline; lobes of the distinctly ribbed fruiting calyx much shorter than the tube.

A. Annuals.

a. PLANTS MORE OR LESS PUBESCENT (EXCEPT *P. Barbadosis obscura*).

I. Fruiting calyx sharply 5-angled, more or less acuminate at the summit and sunken at the base; calyx-lobes (at flowering time) lanceolate or acuminate, as long as the tube or longer.

aa. Calyx-lobes ending in a subulate acumination.

Leaves broadly oval or round, sinuately dentate; calyx in fruit not unusually firm.

1. *P. subulata*.

bb. Calyx-lobes narrow, but not with a subulate tip.

Leaves ovate, oblique, acute or acuminate, subentire at the base; upper part repand or subentire; fruiting calyx small and short; stem slender, diffuse, sharply angled.

2. *P. pubescens*.

Leaves generally very oblique, cordate, strongly sinuately toothed to the base; stem stout, generally erect, obtusely angled; fruiting calyx more rounded.

3. *P. pruinosa*.

Leaves orbicular or broadly ovate, sinuately crenate, at the base scarcely cordate and scarcely oblique; stem very stout and strict; fruiting calyx broadly cordate.

4. *P. Neo-Mexicana*.

Leaves cordate, scarcely oblique, more or less abruptly acuminate, acutely repand dentate; stem tall and erect or widely spreading, acutely angled; fruiting calyx larger, long-acuminate.

5. *P. Barbadosis*.

II. Fruiting calyx obtusely or indistinctly 5-10-angled; calyx-lobes (at flowering time) triangular to lanceolate, generally shorter than the tube, except sometimes in *P. Carpenteri*.

aa. Leaves not long-acuminate.

Peduncles very short, shorter than the fruiting calyx; leaves ovate, more or less sinuately dentate.

6. *P. Lagascae*.

Peduncles 2-3 cm. long, longer than the fruiting calyx; leaves deltoid-ovate, subentire.

7. *P. Greenei*.

bb. Leaves with long acumination, subentire.

Peduncles much shorter than the fruiting calyx; flowers solitary, 4-6 mm. in diameter; fruiting calyx 2-3 cm. long. (Mex.)

8. *P. leptophylla*.

Peduncles about the length of the fruiting calyx or longer; flowers often in fascicles of 2-4, about 1 cm. in diameter; fruiting calyx 1-2 cm. long.

9. *P. Carpenteri*.

b. PLANTS GLABROUS OR THE UPPER PART SPARINGLY BESET WITH SHORT HAIRS OR IN *P. ixocarpa* SOMETIMES A LITTLE PUBERULENT WHEN YOUNG.

III. Fruiting calyx obtusely 5-10-angled, not sunken at the base; corolla yellow, sometimes with the center a little darker but never brown or purple.

aa. Peduncles generally much longer than the fruiting calyx.

Corolla rotate-campanulate, white or cream color, 10-20 mm. in diameter, leaves sinuately toothed.

10. *P. Wrightii*.

Corolla campanulate, yellow, 3-8 mm. in diameter; leaves sinuately toothed or subentire.

11. *P. lanceifolia*.

bb. Peduncles scarcely exceeding the fruiting calyx.

Corolla campanulate, yellow, 8-10 mm. in diameter; leaves sharply dentate.

12. *P. angulata*.

IV. Fruiting calyx obscurely 5-10-angled, not sunken at the base; corolla yellow with a brown or purple center.

Peduncles short, scarcely as long as the flowers, which are 1-1½ cm. in diameter; calyx-lobes broadly triangular.

13. *P. ixocarpa*.

Peduncles longer than the flowers which are 1½-2½ cm. in diameter; calyx-lobes lanceolate-triangular.

14. *P. Philadelphica*. ✓

B. Perennials.

a. LOBES OF THE FRUITING CALYX MORE OR LESS CONNIVENT; FLOWERS GENERALLY WITH A BROWNISH OR PURPLISH CENTER.

*Pubescence not stellate (although in *P. pumila* of branched hairs).

IV. Pubescence on the leaves none, on the upper part of the stem and the calyx sparse and short, if any; flowers large, 1½-2½ cm. in diameter.

aa. Fruiting calyx ovoid, nearly filled with the berry, scarcely sunken at the base. Plant tall and erect; leaves ovate-lanceolate to broadly ovate, usually thin.

14. *P. Philadelphica*.

Plant usually tall; leaves lanceolate, oblanceolate or linear.

15. *P. longifolia*.

Plant low and spreading; leaves more or less fleshy, elliptic-oblong, tapering into a winged petiole.

16. *P. Texana*.

bb. Fruiting calyx pyramidal, very much inflated and deeply sunken at the base.

Leaves broadly ovate, usually coarsely dentate.

17. *P. macrophysa*.

V. Pubescence sparse, consisting of flat, sometimes jointed, and in *P. pumila* branched hairs, in *P. Virginiana* and *P. arenicola* sometimes a little viscid.

aa. Fruiting calyx ovoid, scarcely angled and scarcely sunken at the base; leaves thick, obovate or spatulate to rhomboid, subentire.

Leaves obovate or spatulate; hairs all simple.

18. *P. lanceolata*.

Leaves broader, inclined to be rhomboid; hairs on the lower surface of the leaves branched.

19. *P. pumila*.

bb. Fruiting calyx pyramidal, more or less 5-angled and deeply sunken at the base; leaves ovate or cordate to lanceolate, generally more or less dentate.

Fruiting calyx ovoid-pyramidal; stem stout; rootstock somewhat fleshy; leaves ovate or lanceolate.

20. *P. Virginiana*.

Fruiting calyx oblong-pyramidal or nearly cylindrical; stem and rootstock generally very slender; leaves broadly ovate to cordate, coarsely toothed and reticulate.

21. *P. arenicola*.

Fruiting calyx oblong-pyramidal; stem and rootstock very slender; leaves ovate, truncate, or rarely slightly cordate at the base, subentire; veins not prominent.

22. *P. ciliosa*.

VI. Pubescence dense, short, more or less viscid or glandular (except in *P. Peruviana*), often mixed with long flat jointed hairs.

aa. Pubescence not viscid, short, peduncles much shorter than the leaves.

- Leaves large, cordate, generally long-acuminate; anthers generally purple.
23. *P. Peruviana.*
- bb.* Pubescence more or less glandular or viscid, in the first two mixed with long jointed hairs; peduncles much shorter than the leaves.
Leaves large; blade generally over 5 cm. long, generally more or less cordate; anthers generally yellow, but sometimes purple. 24. *P. heterophylla.*
- Leaves less than 5 cm., rounded ovate or rhombic, scarcely at all cordate at the base; calyx, peduncles and younger branches with long white flat and jointed hairs.
25. *P. comata.*
- Leaves small, less than 5 cm., reniform or cordate, coarsely toothed, calyx, etc., finely and densely viscid pubescent, seldom with any long hairs; stem rarely diffuse.
26. *P. hederæfolia.*
- Leaves small, 2-4 cm. in diameter, nearly orbicular, sometimes a little cordate at the base, not coarsely toothed; stem diffuse or prostrate. 27. *P. rotundata.*
- cc.* Pubescence fine, more or less glandular or viscid; peduncles often as long as the subtending leaves or longer.
Leaves oblong to ovate cordate. 28. *P. muriculata.*
- **Pubescence more or less stellate.
- VII. (The stellate character of the pubescence is scarcely distinguishable by the naked eye, and is sometimes obscure even under the lens, except on the calyx or at least on the margin of its lobes).
aa. Pubescence dense, beautifully stellate.
Leaves cordate, reniform or round, more or less angulately toothed.
29. *P. mollis.*
- Leaves elliptic, sometimes a little cordate at the base, to spatulate or oblanceolate, subentire or repand. 30. *P. viscosa.*
- bb.* Pubescence very fine, partly of stellate, and partly of simple hairs.
Leaves deltoid or cordate, coarsely toothed. 31. *P. Fendleri.*
- Leaves elliptic oblong, subentire. 32. *P. fuscomaculata.*
- cc.* Plant often perfectly smooth, except on the margins of the calyx-lobes, rarely stellate all over when young.
Leaves oblong, oblanceolate or spatulate, or in luxuriant specimens even oval, thin; lateral veins distinct. 33. *P. Elliotti.*
- Leaves linear, thick; mid-rib prominent, but lateral veins obsolete.
34. *P. angustifolia.*
- b.* FRUITING CALYX RETICULATE, OPEN, ITS LOBES NOT CONNIVENT; PUBESCENCE, IF ANY, SHORT AND FINE.
- VIII. Corolla yellowish with a darker center, in age turning purple; leaves not fleshy.
Leaves reniform-cordate to ovate, nervose. 35. *P. versicolor.*
- IX. Corolla yellow, generally without darker center; leaves more or less fleshy, small.
Leaves oblong or cordate. 36. *P. crassifolia.*
- Leaves lanceolate, more or less hastate at the base. 37. *P. hastata.*

§ 2. MICROPHYSALIS. Flowers yellowish; fruiting calyx small, not ribbed, open at the mouth, its lobes equalling or exceeding the tube. Plant covered with long viscid hairs.

Leaves small, ovate or cordate repand crenate; peduncles very short.

38. *P. microphysa*.

§ 3. MAGISTA. Flowers whitish, limb more decidedly 5-lobed. Plant tall, hirsute or glabrate.

Leaves large, broadly deltate.

39. *P. Alkekengi*.

§ I. EUPHYSALIS.

I. *Pubescentes*: Annuals; root much branched, generally weak; fruiting calyx sharply 5-angled, more or less acuminate at the summit, and sunken at the base; calyx-lobes (at flowering time) lanceolate or acuminate, as long as the tube or longer; plant somewhat villous or viscid pubescent (except in *P. Barbadosis obscura*).

1. *Physalis subulata* Rydb. Bull. Torr. Club, 22: 306. 1895.

Annual from a branching root, erect, dichotomously branched, 2-4 decimeters high, stem angular and striate; leaves round-ovate, somewhat oblique at the base, generally coarsely dentate; peduncles shorter than the small corolla, which is 2-3 millimeters in diameter; calyx-lobes shorter than the corolla, ending in a subulate acumination; fruiting calyx sharply angled and purple-veined, heart-shaped in section.

This is intermediate between *P. Barbadosis* and the South Mexican *P. nicandroides* Schlecht. From the former it differs in the more glandular pubescence, and the long acumination of the calyx-lobes; from the latter in its smaller rounder leaves, in its calyx-lobes, which are shorter than the corolla, and in the fruiting calyx, which is smaller and not of a firm texture.*

P. subulata has not yet been collected within the United States, but comes near to its border.

Mexico, State of Chihuahua: C. G. Pringle, no. 1344, 1887 (type). It is in the following herbaria: Columbia University; Harvard University; College of Pharmacy, New York City; University of Minnesota, and Professor Greene.

2. *Physalis pubescens* L. Sp. Pl. 183. 1753; Ed. 2: 262; Lam. Enc. Meth. 2: 101; Roem. & Sch. Syst. Veg. 4: 675; Willd. Sp. Pl. 1: 1023; Enum. Hort. Ber. 1: 232; Pursh, Fl. Am. Sept. 157; Eat.† Man. Ed. 5: 329; Ed. 6: 263; Eat. & Wr. N. A. Bot. 357; Nees†, Linnaea 6: 467; Don. Gard. Dict. 4: 449;

* Another related Mexican species is *P. hirsuta* Mart. & Gal., not Dunal. It differs from *P. subulata* in its larger, less veiny fruiting calyx, from *P. nicandroides* by the calyx, which is not of a firm texture, and from both by its subentire leaves. It most resembles *P. pubescens*, but differs in its subulate calyx-tips.

† These references apply also partly to *P. Barbadosis* and *P. pruinosa*.

Walp. Rep. 3: 24; Gray*, Man. Ed. 2: 340; Ed. 5: 381; Bot. Cal. 1: 541; Proc. Am. Acad. 10: 64; Syn. Fl. 2: part 1, 234; Wats. & Coult*., Gray, Man. Ed. 6 375; Coulter, Man. Rocky Mt. 270 (in part); Nutt. Trans. Am. Phil. Soc. (II.) 5: 193; (1834). Wood, Class-Book, 579 (1863); Bot. & Flor. 264 (1873); Chapman*, Fl. So. U. S. 351; Coulter*, Cont. U. S. Nat. Herb. 2: 300.

P. ramosa Mill. Gard. Dict. Ed. 8: no. 9; Willd. Sp. Pl. 1: 1023.

P. hirsuta Dunal, in DC. Prod. 13: part 1, 445. 1852; Darby, Bot. So. St. 451; not Mart. & Gal.†

Alkekengi procumbens Moench, Meth. 2: 473. 1794.

Stem generally diffuse or spreading, much branched, angled, often a little swollen at the nodes, villous-pubescent or sometimes nearly glabrous; leaves thin, 2–6 cm. long, ovate, acute or acuminate, at the base oblique, slightly cordate and generally entire, upwards repand-denticulate or entire, pubescent, sometimes becoming nearly glabrous except along the veins; peduncles short, 3–5 mm., or in fruit about 1 cm. long; calyx-lobes narrow but not with a subulate tip; corolla 5–10 mm. in diameter yellow with dark centre; anthers usually purplish; fruiting calyx membranaceous, 2–3 cm. long, pyramidal, ovoid-acuminate and more or less retuse at the base.

From Pennsylvania and Florida to California; also in Mexico, Central and South America and India. Specimens from New Mexico, Arizona and Mexico sometimes have a little thicker leaves and longer petioles. They have been labelled *P. montana* by Prof. Greene, but can scarcely be distinguished from some eastern forms.

The following specimens have been examined:

Maryland: Wm. M. Canby, 1863.

Pennsylvania: S. W. Knipe, 1869; Porter, 1869.

District of Columbia: J. W. Chickering; W. M. Canby, 1881.

Virginia: G. Vasey, 1874; Wm. M. Canby, 1878.

Georgia: Chapman, 1884.

Florida: Chapman; J. Donnell Smith; A. P. Garber, 1877.

Tennessee: A. Gattinger, 1887.

Ohio: Wm. Cooper, 1828; Wm. C. Werner, no. 141, 1888.

*These references refer also partly to *P. Barbadosensis* and *P. pruinoso*.

†Bull. Brux. 12, 1: 132. 1845.

- Indiana*: A. H. Young, no. 40 (in part), 1875.
Illinois: J. Wolf, 1881.
Iowa: Wm. Booth, 1859.
Wisconsin: Wm. M. Canby, 1868.
Missouri: Riehl, No. 7, 1838; Engelmann, no. 325, 1841; Bush, 1887, 1893; Eggert, 1893.
Kansas: ? J. E. Bodin, 1891.
Arkansas: H. E. Hasse, 1886; Nuttall.
Texas: Vinzent, no. 107; J. Reverchon, 1874.
New Mexico: H. H. Rusby, no. 310 (*P. montana*), 1881; Wright, No. 1601.
Arizona: E. L. Greene, no. 446, 1880 (*P. montana* Greene).
California: K. C., 1883; C. R. Orcutt, 1883; Maj. Thomas.
Cuba: Wright, no. 3022, 1860-4.
Jamaica: Hitchcock, 1890.
Panama: A. Fendler, no. 248, 1850.
Mexico: E. L. Greene, 1880; Ed. Palmer, no. 140 (in part), 1885.
Venezuela: A. Fendler, no. 2100, 1856-7.
Loo Choo Islands: C. Wright, no. 199, 1853-56.
3. *Physalis pruinosa* L. Sp. Pl. 184. 1753; Ed. 2: 263; Willd. Sp. Pl. 1: 1024; Spreng. Syst. Veg. 1: 698; Roem. & Sch. Syst. Veg. 4: 678.
P. obscura viscido-pubescentis Michx. Fl. Bor. Am. 1: 149, partly (?).
P. pubescens Dunal, in DC. Prod. 13: part 1, 446. 1852, as to the description, but not the synonyms, also American authors; (?) Ell. Bot. S. Car. and Ga. 1: 280.
P. hirsuta repando-dentata Dunal, in DC. Prod. 13: part 1, 445. 1852, in part.
P. pubescens β . Nees, Linnaea, 6: 467, in part.
P. pubescens β . *pruinosa* Don, Gard. Dict. 4: 449. 1838 (in part).
? *P. villosa* Roth, Nov. Pl. Sp. 122, 1821; not Mill.*
? *P. Rothiana* Roem. & Sch. Syst. Veg. 4: 677. 1819.
? *P. viscosa* Ell. Bot. S. C. and Ga. 1: 279. 1817.

Stout, generally erect and more hairy than the preceding and the next two; stem obtusely angled, finely villous or somewhat viscid; leaves firm, 3-10 cm. long, finely pubescent, ovate cordate,

*Gard. Dict. Ed. 8: no. 14, 1768.

generally very oblique at the base, and deeply sinuately toothed with broad and often obtuse teeth; peduncles 2-4 mm., in fruit about 1 cm.; calyx villous or viscid: lobes as long as the tube, narrow but not subulate-tipped; corolla 3-8 mm. in diameter; anthers yellow or tinged with purple; fruiting calyx of a little firmer texture and more pubescent than in the preceding, reticulate, 2-3 cm. long, ovoid, cordate; berry yellow or green.

The pubescence of the stem is often dense and whitish, but only apparently pruinose. It extends farther north than either *P. pubescens* or *P. Barbadosensis*, ranging from Massachusetts to Iowa, Missouri and Florida. No specimens seen either from Mexico or the West Indies.

Massachusetts: W. Deane, 1884; Morong, 1878; Harvard Bot. Garden, 1878.

Connecticut: Miss F. W. Wilson, no. 391, 1892.

New York: T. F. Lucy; A. W. Young, 1892; M. Ruger, 1868.

New Jersey: C. F. Parker, 1870.

Pennsylvania: J. K. Small, 1889.

Delaware: Wm. M. Canby, 1871; A. Commons, 1877.

Virginia: A. H. Curtiss, 1871, 1872.

North Carolina: Beardslee & Kofoed, 1891.

Georgia: Chapman, 1864; J. K. Small, 1895.

Florida: Chapman.

Tennessee: A. Ruth, 1894; Kearney, 1891.

Kentucky: C. W. Short.

Illinois: E. Hall, 1872.

Missouri: Engelmann, 1841; B. F. Bush, 1888.

Kansas: Kellerman, 1888.

Iowa: A. S. Hitchcock, 1875, 1889.

Wisconsin: T. J. Hale, 1861; L. H. Pammel, 1883.

Michigan: Agricultural College, 1886.

Washington:* L. F. Henderson, no. 2496, 1892; W. H. Suksdorf, no. 2285, 1894.

4. *Physalis Neo-Mexicana*.

P. pubescens Porter & Coulter, Syn. Fl. Colo. 110. 1874; Coulter, Man. Rocky Mts., 270, in part. Not L.

* Probably introduced.

Stem stout and strict, obtusely angled; pubescence very fine, dense and short, scarcely viscid; leaves 3–5 cm. long, thicker than in the preceding, broadly ovate or orbicular, very obtuse, scarcely cordate at the base, scarcely at all oblique, sinuately crenate; peduncles very short, even in fruit scarcely more than 2 cm. long; calyx finely pubescent, calyx-lobes lanceolate but not subulate-acuminate; fruiting calyx of a firmer texture than the three preceding, more sharply angled and deeper sunken at the base than in *P. pruinosa*.

This species is very near related to *P. pruinosa*, and has been labeled by me *P. pruinosa neomexicana* in the herbaria, but as its range is widely separated from that of *P. pruinosa*, it is perhaps best to regard it as distinct. It differs in the strict habit, the finer pubescence, the shorter, more round and obtuse leaves and the sharper angled fruiting calyx, which resembles that of *P. subulata*, but does not have the subulate tips characteristic of that species. The following specimens have been examined:

New Mexico: Fendler no. 679 and 678 in part, 1847; E. L. Greene, no. 213, 1880; Vasey, 1889; Chestnut & Drew.*

Colorado: Brandegee (Porter & Coult. Syn. Fl. Colo. 110), Miss Mulford, 1892.*

Lower California: C. R. Orcutt, 1883.

5. *Physalis Barbadosensis* Jacq. Misc. 2: 359. 1781; Ic. Rar. 1: t. 39; Willd. En. Hort. Ber. 1: 232; Sp. Pl. 1: 1023; Roem. & Sch. Syst. Veg. 4: 676; Spreng. Syst. 1: 697 (in part); Mart. & Gal. Bull. Brux. 12: 13.

?*P. patula* Miller, Gard. Dict. Ed. 8: no. 12, acc. to Dunal; Don, Gard. Dict. 4: 451; Walp. Rep. 3: 27.

P. obscura viscido-pubescentis Michx. Fl. Bor. Am. 1: 149. 1803.

P. obscura pubescens Pursh, Fl. Am. Sept. 157. 1814.

P. pubescens American authors (in part).

P. pubescens β Nees, Linnaea, 6: 467 (in part) 1831; Sendtn. in Mart. Fl. Bras. 2: 132.

P. pubescens β . *pruinosa* Don, Gard. Dict. 4: 449. 1838 (in part).

P. hirsuta Barbadosensis Dunal, in DC. Prod. 13: part 1, 446. 1852.

* These specimens are doubtfully referred here. The material is too poor for a definite determination.

P. pruinosa L. Sp. Pl. Ed. 2: 263 (in part) 1762; Ell. Bot. S. Car. and Ga. 1: 279. 1817.

Alicabon Barbadosense Raf. Sylv. Tell. 57. 1838.

Stem stouter than in *P. pubescens*, tall and erect or widely spreading, acutely 3-4-angled, pubescent, viscid or sometimes nearly glabrous; leaves 3-6 cm. long, heart-shaped, acute or generally abruptly acuminate, sharply repand dentate, pubescent with short hairs; peduncles short, 3-4 mm., in fruit sometimes 2 cm. long; calyx generally densely viscid-hirsute, lobes lanceolate, acuminate, but not subulate-tipped; corolla 5-10 mm. in diam.; anthers generally purplish; fruiting calyx longer than in the four preceding, 2½-3 cm. long, acuminate and reticulate, retuse at the base.

P. Barbadosensis has been known in our herbaria either as *P. pubescens* L. or as *P. obscura*, Michx. It is most nearly related to the latter, differing only in the pubescence. They are evidently only varieties of the same species, which must take the name *P. Barbadosensis* Jacq., which is the older. *P. Barbadosensis* is in habit intermediate between *P. pubescens* and *P. pruinosa*, but differs from both in the more elongated fruiting calyx. Its distribution is from North Carolina and southern Illinois to Mexico, the West Indies and South America. The following specimens have been examined:

Florida: Blodgett; Chapman; A. P. Garber, 1877; G. V. Nash no. 1251, 1894.

North Carolina: Darlington.

Pennsylvania: S. W. Knipe, 1869.

South Illinois: Geo. Vasey.

Missouri: Engelmann, 1847; Bush, no. 49, 1888; Weller, 1890.

Indian Territory: Butler, 1877.

Louisiana: Dr. Ingalls; Hale; Teinturier.

Texas: Crawford, 1893; Mex. Bound. Surv. no. 1019 (in part).

Mexico: C. E. Lloyd; E. Palmer, no. 140, 1885; no. 473, 1886; no. 14, 1887; no. 433, 1894.

Venezuela: A. Fendler, no. 1013, 1854-5.

Cuba: C. Wright, no. 3635.

→ *Physalis Barbadosensis obscura* (Michx.).

P. angulata Walt. Fl. Car. 99. 1788, not L.; Nees, Linnaea, 6: 474 (in part); Walp. Rep. 3: 25; Wood, Class-book, 579 (1863); Bot. and Flor. 264 (1873).

P. obscura Michx. Fl. Bor. Am. 1: 149. 1803; Pursh, Fl. Am. Sept. 157; Poir. Enc. Meth. Suppl. 2: 347; Roem & Sch. Syst. 4: 677; Eat. Man. Ed. 3: 390; Ed. 5: 328; Ed. 6: 263; Beck, Bot. 258; Don, Gard. Dict. 4: 451; Walp. Rep. 3: 27; Gray, Proc. Am. Acad. 10: 64; Syn. Fl. 2: part 1, 234; Eaton & Wr. N. Am. Bot. 357; Coult. Cont. U. S. Nat. Herb. 2: 300.

P. Brasiliensis Sendtner, in Mart. Fl. Bras. 10: 131. 1854. See Gray, *l. c.*

P. hirsuta repandodentata Dunal, in DC. Prod. 13: part 1, 445. 1852, in part.

Greener; perfectly smooth or sometimes minutely pubescent, when it grades into *P. Barbadosensis* proper.

The distribution is about the same as that of the species.

Georgia: Chapman, No. 80.

Florida: Chapman, 1889.

Alabama: C. Mohr, 1878.

Louisiana: A. B. Langlois, 1880.

Tennessee: A. Gattinger.

Arkansas: A. E. Heacock, 1889.

↗ *Texas*: E. Hall, no. 503, 1872.

Missouri: Eggert, 1893; B. F. Bush, no. 98, 1893.

Mexico: Schott, no. 5, 1864.

Cuba: Wright, no. 3635 (in part).

Jamaica: Hitchcock.

St. Vincent: H. H. & G. W. Smith, 1328a & 1329, 1890.

Porto Rico: I. Urban, no. 745, 1885.

II. *Leptophyllae*: Annuals; root branched and weak; fruiting calyx obtusely or indistinctly 5-10-angled, scarcely sunken at the base; calyx lobes (in flowering time) triangular to lanceolate, generally shorter than the tube, except sometimes in *P. Carpenteri*. Plants generally more or less pubescent.

↗ 6. *Physalis Lagascae* Roem. & Sch. Syst. Veg. 4: 679. 1819.

P. minima Roxb. Fl. Ind. 1: 563, 1820 not L.;* Nees, Linnaea 6: 479; Don, Gard. Dict. 4: 450 (in part); Walp. Rep. 3: 26; Dunal, in DC. Prod. 13: part 1, 445.

P. parviflora Lag. Gen. & Sp. 11, no. 147. 1816. Not R. Br.†

P. villosa Roth, Nov. Pl. Sp. 122, 1821, not Mill.

* Sp. Pl. 183. 1753.

† Prod. Nov. Holl. 447. 1810.

? *P. Rothiana* Roem. & Sch. Syst. Veg. 4: 677. 1819.

P. pubescens Wats. & Coult. in Gray, Man. Ed. 6: 375, as to B. F. Bush's plant.

Stem spreading, often zigzag, branched, striate or slightly angled, villous with short hairs; leaves 1-8 cm. long, ovate, oblique and cuneate, obtuse, or cordate at the base, acute but not acuminate, repand or sinuately dentate, hairy at least on the veins; peduncles 1-5 mm., erect, in fruit 5-10 mm., reflexed, shorter than the fruiting calyx; calyx villous, lobes shorter than the tube, triangular; corolla 3-8 mm. in diameter, yellow, generally with a dark centre, anthers generally yellow; fruiting calyx 1½-2 cm. long, round-ovoid, nearly filled with the berry, not sunken at the base.

Resembles most *P. pubescens* and *P. pruinosa* but differs by its short calyx-lobes and the fruiting calyx, which is neither sharp-angled nor sunken at the base. It is a native of Mexico, the West and East Indies; in the United States, probably only introduced. Specimens examined:

Kansas: W. A. Kellerman no. 44, no. 47, 1882; W. T. Swingle, 1887; E. K. Popenoe, 1879; Stuart Weller, 1887; Gattinger, 1884.

Missouri: H. Eggert, 1887, 1891; B. F. Bush, 1887, 1888, and 1893, no. 25, no. 1023; J. W. Blankinship, 1893; Engelmann, 1841 and 1847; A. E. Heacox.

Arkansas: Engelmann.

Indian Territory: J. E. Bodin, 1891.

West Indies: Wright, no. 1590.

7. *Physalis Greenei* Rose, Cont. U. S. Nat. Herb. 1: 18. 1890.

P. pedunculata Greene, Pittonia 1: 268. 1889. Not Mart. & Gal.*

Erect-spreading, the flexuous branches angular, 2-3 dm. long; leaves ovate or rhombic, acute, but not long-acuminate, entire or with few shallow teeth, 2-3 cm. long, the slender petioles of about the same length as the blade; corolla greenish yellow, 12-15 mm. in diameter; fruiting calyx 1-1½ cm. long, pendulous on the long peduncle, which exceeds it in length.

Mexico, Cedros Island: Lieut. C. F. Pond, 1889 (Type of *P. pedunculata* Greene); Dr. Sheets; *Lower California*: Edw. Palmer, no. 561, 1887; *Carmen Island*: Edw. Palmer, no. 10, 1870.

* Bull. Brux. 12: 132. 1845.

California: O. D. Allen, no. 11, 1884 (Harvard University herbarium); M. E. Jones, no. 88, 1882.*

8. *Physalis leptophylla* Robinson & Greenman, Proc. Am. Acad. 29: 389. 1894.

Stem sometimes slightly woody below, striate, finely pubescent; leaves ovate, entire, abruptly long-acuminate, obtuse or cordate at base, green, of a delicate texture, often nearly glabrous except the ciliate margins; peduncles solitary, shorter than the fruiting calyx, calyx-teeth short, ovate; corolla apparently whitish with a dark spot at the base, 4-6 mm. long; fruiting calyx 2-3 cm. long.

I have seen no roots of this species and cannot tell if it is an annual or not, but otherwise it comes nearest to the two preceding. It is a native of northern Mexico. Specimens examined:

Mexico, Sonora: Edw. Palmer, 709, 1890; W. G. Wright, no. 1252, 1889; C. G. Pringle, no. 5455, 1893.

9. *Physalis Carpenteri* Riddell,† Chapman in Coulter's Bot. Gaz. 3: 11, as synonym. 1878.

Withania Morisoni Chapman *l. c.*, not Dunal.

Athenaea sp. Gray. Syn. Fl. 2: part 1, 233. 1878.

Stem tall, erect, branching above, somewhat angled and striate, closely and finely puberulent; leaves very thin, oval or ovate, abruptly contracted into a long acumination, entire or slightly wavy, nearly smooth or puberulent, much resembling those of *P. leptophylla*, somewhat cordate and oblique at the base; peduncles about 1 cm. long, very slender; flowers often in fascicles of 2-4; corolla about 1 cm. wide, open-campanulate; fruiting calyx small, only 1 cm. in diameter, nearly globose, scarcely angled and faintly nerved; the lobes sometimes very unequal.

P. Carpenteri is very variable. Among the few specimens found in our herbaria, viz.: those of Columbia University, Harvard University and the Missouri Botanical Garden, there are several forms. In some the leaves are very broad, in others narrower; in some the flowers are solitary, in others in fascicles; in some the calyx-lobes are short and equal, in others much elongated and unequal; but without doubt they all belong to one species.

* Doubtfully referred here. The leaves are unusually large for this species. As there is no fruit, the determination is uncertain. Mr. Jones' specimens are labeled *Chamaesaracha* sp.

† In Riddell's Cat. Fl. Ludov. in N. O. Med. and Surg. Jour. 8: 758. 1852, *P. Carpenteri* is a *nomen nudum*.

Louisiana: Riddell; Buckley; Dr. Ingalls, 1835; Curtiss, 1886.

Alabama: Buckley.

Florida: Nash, no. 2503, 1895.

III. *Angulatae*: Annuals with a branching root, glabrous or the upper parts sparingly beset with short hairs; fruiting calyx on a slender peduncle, obtusely 5-10-angled, not sunken at the base; flowers yellowish or whitish, sometimes with the center a little darker but never brown or purple.

10. *Physalis Wrightii* Gray, Proc. Am. Acad. 10: 63. 1874; Syn. Fl. 2: part 1, 234; Coulter, Cont. U. S. Nat. Herb. 2: 299.

Chamaesaracha physaloides Greene, Bull. Torr. Bot. Club, 9: 122. 1882; Gray, Syn. Fl. 2: part 1, 437.

Stem erect or ascending, 1-10 dm. high, branched, angled, smooth or the upper parts sparingly beset with short hairs; leaves as in the next but generally more deeply sinuately toothed, broader and with stronger veins; peduncles and fruiting calyx as in the next; calyx-lobes lanceolate, generally longer than the tube; corolla 10-20 mm. in diameter, widely rotate-campanulate, according to Gray l. c. "apparently white," according to Greene, l. c., cream color, and according to Lemmon on the herbarium label, white with yellowish throat (in the herbarium specimens it is light sulphur yellow).

The original specimens of Gray are in an undeveloped and perhaps depauperate state. The better developed specimens of later collections are generally labelled *P. angulata Linkiana*, to which it bears scarcely any relationship.

The following specimens have been examined:

Texas: C. Wright, no. 1602, 1851-2; Schott, no. 28.

Arizona: Pringle (broad-leaved) 1884, 1894; Palmer, no. 203, 1867; Engelmann, 1880; Lemmon, 1881, with *Quincula lobata*.

New Mexico: Vasey, 1889; Wright, no. 1602, 1851-2.

California: Buckmeister, 1881 (Type of *Chamaesaracha physaloides* Greene); Lemmon no. 294, and no. 10, 1880.

Mexico: Palmer, no. 175, 1887; C. V. Hartman, no. 63, 1894.

11. *Physalis lanceifolia* Nees, Linnaea 6: 473. 1831; Don, Gard. Dict. 4: 450; Walp. Rep. 3: 25; Dunal, in DC. Prod. 13: Part 1, 477; Schlecht. Linnaea, 19: 309. 1847.

P. angulata Ruiz & Pav. Fl. Peruv. 2: 43. 1799, and American authors in part, as Coulter Cont. U. S. Nat. Herb. 2: 300; not L.

Erect, generally one-half meter high, branched; stem angled, glabrous; leaves in the typical form lanceolate, subentire or slightly toothed; calyx cylindrical-campanulate, lobes broadly triangular, shorter than the tube; peduncles filiform, about 2 cm. long, erect with nodding flower, in fruit 4-5 cm. long and reflexed; corolla 5-8 mm. in diameter, campanulate, yellow, without a dark spot; anthers yellow, more or less tinged with purple; fruiting calyx about 2 cm. long, rounded ovoid, indistinctly 10-angled and purple-veined, nearly filled with the berry.

It is a native of Peru, Mexico, etc. No specimens of the typical form have been collected in the United States. The only specimens approaching it are those collected by Rugel near St. Mark's River, Florida (Herbarium of Missouri Botanical Garden), but these have much narrower leaves.

Two forms are found, however, in the United States, which come nearer to this species than to any other, although they connect it with *P. Wrightii* and *P. angulata* respectively.

In the first the leaves are more or less sinuately toothed and often more strongly veined, resembling those of the preceding species, which it also resembles in general habit and in the sparse scabrous hairs on the upper parts, but differs in the small flowers (only 3-5 mm. in diameter), which in form perfectly agree with the true *P. lanceifolia*, that is, they are truly campanulate. The following specimens belong to this form:

Arizona: Lemmon, 1881 (in part); Dr. Smart, no. 375, 1867; Loew, 1875; Maj. Thomas; Schott, no. 2. (The last two, doubtfully referred to *P. Wrightii*, by Dr. Gray, Proc. Am. Acad. 10: 63).

California: K. C., 1883; C. R. Orcutt, no. 2069, 1890.

Texas: E. Hall, no. 504, 1872; Chas. Wright, no. 529, 1849 (locality not given).

The other form connects *P. lanceifolia* with *P. angulata*. The leaves are broader than in the typical form and often with sharp teeth as in *P. angulata*, but the very long peduncles, small round fruiting calyx, and general habit, make it more nearly related to *P. lanceifolia*. Its range is much more northern than that of the typical *P. lanceifolia* and more northwestern than that of *P. angulata*, as can be seen from the following specimens studied:

Illinois: Vasey, 1862.

Missouri: Engelmann, 1841; A. Geyer, 1841 (both in the her-

barium of Mo. Bot. Garden); H. Eggert, 1877 (herb. J. Donnell Smith).

Arkansas: F. L. Harvey, no. 65 (herb. Univ. Nebraska); H. E. Hasse, 1886 (herb. Univ. Tennessee).

Texas: H. 1862 (herb. Mo. Bot. Garden).

12. *Physalis angulata* L. Sp. Pl. 183. 1753; Ed. 2: 262; Mill. Gard. Dict. Ed. 8: no. 10; Lam. Enc. Meth. 2: 101; Spreng. Syst. Veg. 1: 697 (in part); Willd. Sp. Pl. 1: 1022; Enum. Hort. Ber. 1: 232; Roem. & Sch. Syst. Veg. 4: 676; Don. Gard. Dict. 4: 450; Walp. Rep. 3: 25; Nees, Linnaea, 6: 474 (in part); Dunal in DC. Prod. 13: part 1, 448; Gray, Man. Ed. 2: 339; Ed. 5: 381; Proc. Am. Acad. 10: 64; Syn. Fl. 2: part 1, 234; Wats. & Coult. in Gray, Man. Ed. 6: 375; Ell. Sk. Bot. S. C. and Ga. 1: 278; Chapman, Fl. So. St. 351; Coult. Man. Bot. Rocky Mt. 269 (in part).

P. dubia Link, Enum. Hort. Berol. 1: 181, 1821; not Gmelin.

P. Linkiana Nees, Linnaea, 6: 471. 1831; Don, Gard. Dict. 4: 449; Walp. Rep. 3: 25; Dunal in DC. Prod. 13: part 1, 448; Sendt. in Mart. Fl. Bras. 10: 131; Wood, Class Book 579, 1863; Bot. and Flor. 264, 1873.

P. arenaria Nees. l. c. as synonym.

P. Peruviana and *P. minima* Wallr. Cat. acc. to Nees, l. c. and Dunal, l. c.

P. angulata Linkiana Gray, Proc. Am. Acad. 10: 64. 1875; Syn. Fl. 2: part 1, 234.

P. ciliata Sieb. & Zuce. Fl. Jap. Fam. Nat. 2: 22, 1846; acc. to Kew Index.

Erect, $\frac{1}{2}$ –1 m. high, glabrous, stem angular; leaves ovate, with more or less cuneate base, somewhat sinuately toothed with long acuminate teeth; blade 4–7 cm. long, on slender, 2–4 cm. long petioles, thin, veins not prominent; peduncles slender, 2–3 cm., erect, in fruit often reflexed but seldom exceeding the fruiting calyx in length; calyx smooth, lobes triangular to lanceolate, generally shorter than the tube; corolla 5–10 cm. in diameter; anthers more or less purplish tinged; fruiting calyx about 3 cm. long, ovoid, not prominently 5–10-angled, sometimes purple-veined and at last nearly filled with the yellow berry.

Its range extends from North Carolina to Texas, Central America, Brazil and the West Indies; also in India.

North Carolina: G. McCarthy, no. 18, 1885; Darlington; Wm. M. Canby, 1867.

South Carolina: T. C. Porter, (a narrow-leaved form); Ravenel; M. A. Curtis.

Florida: Blodgett; Chapman, no. 115; A. H. Curtiss, no. 1043, 1876; no. 2208; G. V. Nash, no. 1052, 1894; A. W. Chapman.

Georgia: J. K. Small, 1894.

Louisiana: Riddell; S. T. Olney; Hale.

Illinois: H. Eggert.

Indian Territory: Bush, no. 397, 1894.

Cuba: C. Wright, no. 3637, 1865, etc.

Jamaica: Hitchcock, no. 1130, 1892.

St. Thomas: Eggers, no. 295, 1830.

Panama: Fendler, no. 247, 1850.

British Guiana: Jenman, no. 5155.

Brazil: Saint-Hilaire, no. 41 B, 1816-21.

Peru: Wilkes Exp., 1838-42.

IV. *Philadelphicae*: Annuals with a branching root or perennials with a thick more or less fleshy rootstock; fruiting calyx (except in *P. macrophysa*) indistinctly 5-10-angled and seldom sunken at the base; flowers large, 1-2½ cm. in diameter, yellow with a brown or purple center; pubescence on the leaves none, on the upper part of the stem and the calyx sparse and short, if any, or in young plants of the first species sometimes finely puberulent.

12. *Physalis ixocarpa* Brot.* Horneman, Hort. Hafn. Suppl. 26. 1819.

P. aequata Jacq. f.; Nees in Linnaea, 6: 470. 1831; Don, Gard. Dict. 4: 449; Jacq. f. Ecl. 2: t. 137. 1844; Walp. Rep. 3: 25; Schiede & Schlecht. Linnaea, 19: 309; Dunal in DC. Prod. 13: part 1, 447; Gray, Proc. Am. Acad. 10: 64; Syn. Fl. 2: part 1, 234; Bot. Cal. 1: 541. Coulter, Cont. U. S. Nat. Herb 2: 300; S. B. Parish, Zoe, 1: 122.

P. Philadelphica minor Dunal in DC. Prod. 13: Part 1, 450. 1852.

At first erect, later widely spreading, much branched; stem angled, glabrous or the younger parts sparingly hairy; leaves from cordate to ovate with cuneate base, which is somewhat oblique, sinuately dentate or entire, 3-6 cm. long; peduncles short, 2-5 mm.; calyx sparingly hairy, lobes short, broadly triangular, shorter

*The name was published in 1183 in DC. Cat. Hort. Monsp.

than the tube; corolla bright yellow with purple throat, 1-1½ cm. (sometimes nearly 2 cm.) in diameter; fruiting calyx rounded ovoid, obscurely 10-angled, often purple-veined, at last often filled with the purple berry, which sometimes bursts it.

P. ixocarpa is a native of Mexico and bordering states. It is often cultivated for its fruit and escapes frequently from cultivation. The cultivated specimens have often larger flowers and more sinuately toothed leaves, and have often been mistaken for *P. Philadelphica*, from which it can be distinguished by its short peduncles which are scarcely longer than the calyx, and by its short and broad calyx-lobes.*

The following specimens have been examined:

Native:

California: Dr. T. Coulter, no. 584; Parry and Lemmon, 1876; J. C. Nevin, 1878; Engelmann, 1880; S. B. and W. F. Parish, no. 585, 1882; 1888; W. G. Wright, 1889; C. P. Bingham, no. 29; S. B. Parish, 1893; Dr. E. Hasse, 1887.

Colorado: Brandegee, 1873.

New Mexico: Fendler, no. 680, 1847.

Texas: Berlandier, no. 857; C. Wright, 1848.

Mexico: Dr. J. Gregg, no. 308, 1848; Thurber, no. 852, 1852; Bourgeau, no. 871 and 2694, 1865-6; J. G. Schaffner, no. 701, 1876; H. E. Seaton, no. 453, 1891; Halsted; E. Kerber, no. 288A; Parry and Palmer, no. 640 and 646, 1878; Palmer, no. 946, 1880; no. 1 and 2, 1886; W. G. Wright, no. 1253, 1889; Pringle, no. 896, 1886.

Cuba: C. Wright, no. 36361.

Introduced or cultivated:

Massachusetts: W. Deane; Harvard Botanic Garden.

New York: Geneva (Nat. Herb. nos. 126164 and 126165), 1887; T. F. Allen.

New Jersey: C. F. Parker, 1874.

Pennsylvania: Martindale, 1876, 1879, Parker, 1874.

District of Columbia: Richardson, 1878.

Maryland: J. Donnell Smith, 1876.

Virginia: Schriver, no. 38, 1882.

* Specimens collected by W. N. Suksdorf (no. 2284) in W. Klickitat county, Wash., has the general habit and leaves of *P. Philadelphica*, the short peduncles and fruit of *P. ixocarpa* and the flowers intermediate between the two. It may be distinct but the material is incomplete.

Ohio: Beardslee.

Missouri: Engelmann, 1880.

Illinois: Engelmann, 1881.

Michigan: Bailey, 1884; no. 4, 1887.

Wisconsin: T. J. Hale, 1861.

Minnesota: Holzinger, 1889; Wm. M. Canby, 1868.

Dakota: J. M. Coulter.

Oregon: L. F. Henderson, no. 93, 1885.

Washington: T. S. Brandegee, 1885; H. E. Seaton, no. 372.
1891, in part.

14. *Physalis Philadelphica* Lam. Enc. Meth. 2: 101. 1786; Pursh, Fl. Am. Sept. 157; Roem. & Sch. Syst. Veg. 4: 677; Nees, Linnaea, 6: 481; Don, Gard. Dict. 4: 450; Walp. Rep. 3: 26; Dunal, DC. Prod. 13: part 1, 450; Eat. Man. Ed. 2: 358; Ed. 3: 390; Ed. 5: 329; Ed. 6: 263; Gray, Man. Ed. 1: 354; Ed. 5: 381; Proc. Am. Acad. 10: 64; Syn. Fl. 2: part 1, 234; Wats. & Coulter in Gray, Man. Ed. 6: 375; Torr. Fl. N. & M. U. S. 235; Eat. & Wright, N. Am. Bot. 357; Wood, Class Book, 579 (1863); Bot. & Flor. 264 (1873); Noll, Fl. Pa. 282; Coult. Cont. U. S. Nat. Herb. 2: 300.

P. chenopodifolia Willd. Sp. Pl. 1: 1023. 1798. Not Lam.*

P. atriplicifolia Jacq. Frag. 58, pl. 85 (1800-8), Poir. Enc. Meth. Suppl. 2: 348; Roem. & Sch. Syst. Veg. 4: 677.

P. ovata Poir. Enc. Meth. Suppl. 2: 347. 1811.

P. megistocarpa Zuccagn. Obs. Cent. no. 57; Roem. Coll. Bot. 130. 1809.

P. angulata Philadelphica Gray, Man. Ed. 2: 340. 1856.

P. angulata Spreng. Syst. Veg. 1: 697. 1825 (in part); Porter & Coulter, Syn. Fl. Col. 110. In part. 1874.

Annual, or perennial from a deep rootstock, tall, erect, $\frac{1}{2}$ -1 $\frac{1}{2}$ m. high; stem angled, dichotomously branched, glabrous or sometimes slightly pubescent with sparse and short hairs on the upper parts; leaves ovate to ovate-lanceolate, often very oblique at the base and more or less acuminate, entire or repand-denticulate, 6-10 cm. long, on petioles 4-6 cm., often in pairs; peduncles slender, 1-2 cm. long, generally longer than the flower; calyx glabrous or minutely ciliolate, lobes ovate-lanceolate or triangular, sometimes broadly ovate and unequal, generally equalling the

*Ill. 2: 28 (1791-3).

tube; corolla yellow or greenish yellow with purplish throat, 1.5–2.5 cm. in diameter, anthers tinged with purple; fruiting calyx at first somewhat 10-angled and sunken at the base, at last often filled with or even burst by the large red or purple berry.

Broad-leaved forms somewhat resemble *P. macrophysa*, with which they may be confused if the fruit is not examined. Narrow-leaved specimens seem to connect it with *P. longifolia*. *P. Philadelphica* is generally described as an annual. In the western part of its range, it is, as a rule, perennial from a deep rootstock resembling that of *P. longifolia*, *P. macrophysa* and *P. Virginiana*; but perennial specimens have been collected as far east as New Jersey (F. L. Stevens). In the East, as a rule, it is an annual with branching roots, and somewhat resembles *P. ixocarpa*. The perennial specimens generally have broader leaves, of a somewhat firmer texture, and are less oblique at the base, but these characters are not constant, and I have failed to find any character which would warrant the division of the species into two, one annual and one perennial. The general habit, the form and size of the flower, the peduncles and the fruiting calyx are always the same. If it can be divided into two, the name *P. Philadelphica* should be retained for the annual form.

P. Philadelphica ranges from Rhode Island and Georgia to Texas and Nebraska. The following specimens have been examined:

New York: G. W. Clinton.

Rhode Island: I. T. Collins, no. 7, 1892.

New Jersey: Rusby, 1879; F. L. Stevens (perennial).

Pennsylvania: J. B. Brinton, 1891; R. G. Bechdoldt, 1889; T. C. Porter, 1858, 1889; J. K. Small, 1889.

North Carolina: C. F. Millsbaugh, no. 627, 1890.

Georgia: Chapman.

Kentucky: H. H. Eaton, 1831; O. Mueller.

Tennessee: Gattinger, 1880; C. W. Short; Wm. M. Canby, 1878.

Louisiana: Chapman; Dr. J. Hale, 1884.

Texas: Mrs. M. L. Nash,* 1888; E. Palmer, no. 947,† 1880, 1879; E. Hall, 499† (in part); Reverchon, 1874.

* Narrow-leaved with more inflated calyx.

† Thick-leaved forms, doubtfully referred here. They may perhaps belong to *P. Texana*.

Colorado: Brandegee, 1873, 1874.

Nebraska: T. N. Hayden, 1853; H. Engelmann, 1856.

Missouri: Lindheimer, 1839; Engelmann, 1841; L. H. Pammel, 1894; B. F. Bush, no. 263, 1893.

Illinois: Dr. Brendel, 1873; J. Wolf, 1881; H. N. Patterson, 1874.

Arkansas: F. L. Harvey.

Ohio: E. Wilkinson, 1887; C. G. Lloyd, 1882; H. C. Cowles, 1890.

Iowa: P. H. Rolfs, 1891; A. S. Hitchcock, 1884 and 1889; L. H. Pammel, 1894; Stewart, 1891.

Venezuela: A. Fendler, no. 1012, 1854-5.

15. *Physalis longifolia* Nutt. Trans. Am. Phil. Soc. (II) 5: 193. (1834); Dunal in DC. Prod. 13: part 1, 447; Torr. Bot. Mex. Bound. Surv. 153.

P. pumila Sonorae Torr. Bot. Mex. Bound. Surv. 153. 1859.

P. lanceolata laevigata Gray, Proc. Am. Acad. 10: 68. 1875; Syn. Fl. 2: Part 1, 237; Coult. Man. Rocky Mt. 270; Wats. & Coult. in Gray, Man. Ed. 6: 376; Coult. Cont. U. S. Nat. Herb. 2: 301.

Perennial from a thick rootstock; stem in the common form stout and tall, $\frac{1}{2}$ -1 m. high, slightly angled, branched above, the branches strict, glabrous; leaves lanceolate, oblanceolate or linear, tapering into a stout short petiole 1-2 cm. long, subentire or repand; peduncles 1-2 cm. long, in fruit often recurved; calyx generally glabrous, lobes triangular-lanceolate, about the length of the tube; corolla 1-2 cm. in diameter, yellow with a dark commonly brownish center; anthers yellow, tinged with purple; fruiting calyx ovoid, about 3 cm. long, not sunken at the base; berry yellow, the lower portion and the stipe glutinous.

P. longifolia is nearly related to the preceding. Nuttall, in the original description, states that it is very near to *P. chenopodifolia*. Probably he meant *P. chenopodifolia* Willd. (changed to *P. atriplicifolia* Jacq.), which is the preceding species, not that of Lamarck. The original specimens of Nuttall are not of the normal type. They lack the strict habit characteristic of the common form. The leaves are also more plainly lanceolate than usual.

P. longifolia grows generally in rich soil in the prairie and plain region of central United States, viz:

Iowa: L. H. Pammel, No. 94.

Nebraska: F. C. Clements, no. 2604, 1893; Rydberg, no. 272, 1891; Seigrist, 1889; Woods & Saunders, 1893; J. M. Bates, no. 95, 1892; Misses Smith and Lee, 1894.

South Dakota: Hayden, 1853; T. A. Williams, 1891; Rydberg, no. 910, 1892.

Wyoming: H. Engelmann, 1856.

Colorado: Greene, no. 323, 1870; Miss A. Eastwood, 1892; T. S. Brandegees, 1873; L. F. Ward, 1881; M. E. Jones, no. 573, 1878.

Utah: C. C. Parry, 1875; L. F. Ward, no. 676, 1875.

New Mexico: Dr. Henry; C. Wright, no. 1605, 1851-2; Fendler, no. 681, 1847; Parry, no. 170, 1867.

Arizona: Dr. Smart, no. 365, 1867; C. G. Pringle, no. 30, 1881; 1891; Palmer, no. 363½, 1877; Dr. Patzky, 1890.

Arkansas: Coville, no. 207, 1886-7; Marcy's Exp.

Missouri: S. B. Parish, 1883; S. Weller, 1890; Wm. M. Canby, 1871.

Kansas: C. L. Shear, no. 125, 1894; Kellerman, no. II. (in part); J. E. Bodin, 1887; E. E. Gay, no. 492, 1892.

Texas: Wright, no. 1605, 1851-2.

Mexico: Parry & Palmer, no. 643 and 647, 1878; G. Thurber, no. 418, 1851; Cooper; Dr. Gregg, no. 422, 1848-49; Pringle, no. 2804, 1889.*

Without given locality:

Mex. Bound. Sur., no. 1022, 1852.

Fremont, 3d Exp., no. 467, 1845.

Nicoll. Exp., A. Geyer, no. 249, 1839.

➤ 16. *Physalis Texana* n. sp.

Perennial from a deep rootstock, low and diffuse, glabrous; stem angular and striate, somewhat fleshy; leaves broadly ovate, generally very oblique at the base and decurrent on the long margined petiole, somewhat fleshy, entire or slightly wavy and with the veins prominent on the lower surface; peduncles short, about 1 cm. long, scarcely longer than the flower, in fruit 2-3 cm.; calyx-lobes broadly ovate-triangular, about the length of the short tube; corolla lemon-yellow with darker spots, 2-2½ cm. in diameter, very villous in the throat; anthers yellow; fruiting calyx about 3 cm. long, ovoid, indistinctly 10-angled, not sunken at the base; berry purplish.

* Broad-leaved.

It is nearly related to the two preceding. Perhaps all three are but varieties of the same species. It differs from *P. Philadelphia* in the subentire more obtuse leaves, which are generally long-petioled, from *P. longifolia* in the much broader and shorter leaves, and from both in its low, diffuse and more fleshy habit, its shorter peduncles and the very dense and woolly pubescence of the throat of the corolla.

The following specimens have been examined:

Texas: A. A. Heller, no. 1507, 1894 (type); F. Lindheimer, 1828; E. Hall, no. 499, 1872, in part (Herb. College of Pharmacy, New York City).

17. *Physalis macrophysa* Rydberg, Bull. Torr. Bot. Club, 22: 308. 1895.

Perennial; root somewhat thick and fleshy; stem erect, 0.5–1 meter high, comparatively slender, angled, perfectly glabrous, or the upper parts sparingly pubescent with very short hairs; leaves large, thin, 4–8 centimeters long, 2–5 centimeters wide, the lower obtuse, the upper acute or acuminate, on slender petioles 2–4 centimeters long; peduncles 1–1.5 centimeters long, erect, in fruit reflexed; calyx smooth, lobes ovate-triangular or broadly lanceolate, generally a little shorter than the tube; corolla yellow with a dark center, about 2 centimeters in diameter; anthers generally yellow, sometimes tinged with purple; fruiting calyx large, 3–4 centimeters long, 2.5–3 centimeters in diameter, pyramidal to ovoid-conic, indistinctly 10-angled, deeply sunken at the base; berry small, in the center of the calyx.

This is nearly related to *P. longifolia* and *P. Philadelphia*, but differs from both by its very large and inflated fruiting calyx and its broader leaves. The following specimens have been examined:

Arkansas: A. E. Heacock, 1889.

Kansas: E. A. Popenoe, no. 68, 1875.

Texas: Lindheimer, 1828; A. A. Heller, no. 1756. 1894.

North Carolina (?): Small and Heller, no. 389. 1891.*

Ohio (?): T. H. Horsford,* 1879; C. W. Short,* garden.

V. *Lanceolatae*: Perennials from a rootstock, which, in most of the species, is slender and creeping, but in *P. Virginiana* thick and somewhat fleshy; pubescence sparse, consisting of flat, sometimes jointed, simple or in *P. pumila* branched hairs (but on the calyx never stellate), in the last three sometimes a little viscid; leaves from lanceolate to ovate-cordate.

* These specimens lack fruit, and may belong to *P. Philadelphia*, but the leaves most resemble those of *P. macrophysa*.

18. *Physalis lanceolata* Michx. Fl. Bor. Am. 1: 149, 1803. Pursh, Fl. Am. Sept. 157; Eat. Man. Ed. 2: 358; Ed. 3: 390; Ed. 5: 329; Ed. 6: 263; Eat. & Wr. N. A. Bot. 357;* Holzinger, Cont. U. S. Nat. Herb. 1: 212, in part.

P. Pennsylvanica lanceolata Gray, Man. Ed. 5: 382. 1867; Wood, Bot. & Fl. 263; Porter & Coult. Syn. Fl. Col. 110.

Perennial; rootstock apparently as a rule slender and creeping; stem about $\frac{1}{2}$ m. high, first erect, later spreading or diffuse, only slightly angled, sparingly hirsute with flat hairs; leaves broadly oblanceolate or spatulate, tapering into the petiole, acute or obtuse, nearly always entire, rarely wavy, but never sinuately toothed, thickish, sparingly hairy with short hairs; peduncles 1–2 cm. long, in fruit reflexed; calyx strigose or villous, rarely glabrous, lobes triangular-lanceolate; corolla dullish yellow with a brownish center, about $1\frac{1}{2}$ cm. in diameter; fruiting calyx rounded ovoid, not sunken at the base, indistinctly 10-angled; berry yellow or greenish yellow.

It has generally been confused with *P. Virginiana* Mill., not Gray, but is easily distinguished by the fruiting calyx which is not sunken at the base and scarcely angular, by the slender rootstock, by the dullish yellow corolla, and by the leaves, which are much thicker in texture, of a darker green color, and entire or nearly so. Its nearest relative is the next species into which its broader-leaved forms seem to pass.

P. lanceolata grows on dry prairies and is common west of the Missouri River, but extends eastward to the Carolinas.

North Carolina: H. W. Ravenel, 1869.

South Carolina: H. W. Ravenel, 1866.

Louisiana: Marcy Exp.

Illinois: W. S. Moffatt, 1893.

Iowa: Arthur, no. 37, 1858.

Missouri: L. H. Pammel, 1888.

Kansas: Kellerman, no. 5,† 1888; E. Bartholomew, 1891; M. A. Carleton, no. 298, 1891.

Nebraska: H. Englemann; Rydberg, no. 273, 1891; no. 1330, 1893; F. C. Clements, no. 2968, 1893; Webber, 1889; Hapeman, 1891; Smith & Pound, no. 151, 1892; A. F. Woods, no. 330, 1892; Fremont, no. 4.

* In later American works, the references belong only partly to this species, but mainly to *P. Virginiana*, under which they will be found.

† Approaches *P. pumila* in habit.

Colorado: T. S. Brandegee, no. 58951, 1872; Miss Eastwood, 1892; M. A. Carleton, 1890; H. C. Beardslee, no. 2216, 1879; W. A. Henry, 1875* ; Geo. Vasey, 461, 1868; Hall & Harbour, no. 162, 1862; Hayden.

Wyoming: Spec. in Herb. University of Wyoming.

Arizona: J. G. Lemmon, 1882,* 1848.

New Mexico: Fendler, no. 682, 1847; Wislizenus, no. 466, 1846.

19. *Physalis pumila* Nutt. Trans. Am. Phil. Soc. (II.) 5: 193. 1834.

P. lanceolata hirta Gray, Proc. Am. Acad. 10: 68, 1874; Syn. Fl. 2: part 1, 237; Wats. & Coult. in Gray, Man. Ed. 6: 376; Coult. Cont. U. S. Nat. Herb. 2: 301.

P. lanceolata pumila Rydberg, in MS. in several herbaria.

P. cinerascens Hitchcock, Spring Fl. Manhattan, 32. 1894.
Not *P. Pennsylvanica cinerascens* Dunal.†

P. Pennsylvanica Gray, Hall's Pl. no. 501.

Perennial from a slender rootstock, $\frac{1}{2}$ –1 m. high; stem obscurely angled; leaves thick, generally broadly ovate, acute at both ends and somewhat rhomboid, the lower often obtuse and obovate, generally much larger than in the preceding; blade 5–10 cm. long, entire or seldom sinuate, on petioles, 2–3 cm. long strigose with many-branched hairs, especially so on the lower surface; peduncles 1–2 cm. long, in fruit reflexed and 3–5 cm. long; calyx densely hirsute, not stellate, lobes triangular, generally a little shorter than the tube; corolla yellow with brown center, $1\frac{1}{2}$ –2 cm. in diameter; fruiting calyx generally more elongated than in the preceding, 4–5 cm. long, oblong-ovoid, a little sunken at the base, indistinctly 10-angled.

P. pumila is related to the preceding species and may be but a variety thereof, but as the stouter habit, the larger and more acute leaves, the longer and denser pubescence of the stem and the forked pubescence of the leaves are characters that nearly always go together, I have given it, doubtfully, a specific rank. Seeing only the broad-leaved forms, nobody would hesitate to do so, but the narrower leaved forms, as for instance the type specimens of Nuttall, can scarcely be distinguished from the broad-leaved ones of *P. lanceolata*, except by the forked pubescence. This character distinguishes also the more luxuriant forms with

*Some with a few branched hairs.

†DC. Prod. 13: Part 1, 435. 1852.

rhomboidal leaves from *P. heterophylla ambigua* which they somewhat resemble. *P. pumila* approaches *P. mollis cinerascens* only in the fact that the hairs are branched.

P. pumila belongs to the plain region west of Mississippi and ranges from Missouri to Colorado and Texas.

Missouri: B. F. Bush, no. 1028, 1888; no. 8, 1882; no. 264c 1893; no. 264A; no. 339, 1894; S. Weller, 1887.

Kansas: C. G. Pringle, 1885; J. H. Oyster, 1886; Mary Waugh, 1893; W. C. Stevens*; J. H. Carruth, 1879.

Arkansas: Nuttall (type); Engelmann, no. 153, 1875.

Indian Territory: G. D. Butler (broad-leaved)* 1877; no. 6, 1877, and no. 84; B. F. B.; Ed. Palmer, no. 213, 1868.

Colorado: Beardslee.

Texas: Reverchon, no. 681, 1879; Lindheimer, no. 94; E. Hall, no. 501, 1872; Drummond, no. 239, 1835.

20. **Physalis Virginiana** Mill. Gard. Dict. Ed. 8: no. 4; Fig. Pl. 138. *pl.* 206. *f.* 1; Walp. Rep. 3: 26.

P. lanceolata † Roem. & Sch. Syst. Veg. 4: 673; Torr. Fl. N. and M. U. S. 233; Comp. Fl. U. S. 111; Nicollet, Rep. 156; Beck, Bot. 158; Ed. 2: 255; Wood, Class Book, Ed. 41: 447 (1855); 579 (1863); Don, Gard. Dict. 4: 448; Walp. Rep. 3: 26; Gray, Proc. Am. Acad. 10: 66; Syn. Fl. 2: part 1, 236; Chapman, Fl. So. St. 350 (in part?); Coult. Man. Rocky Mts. 270; Cont. U. S. Nat. Herb. 2: 301; Wats. and Coult. in Gray, Man. Ed. 6: 376, mainly.

P. Pennsylvanica Gray, Man. Ed. 5: 382 (1867); Spreng. Syst. Veg. 1: 697 (in part); Torr. Fl. N. and M. U. S. 234 †; Comp. 110 †; Darlington, Fl. Cest. 27 (1826) †; Beck, Bot. 258 †; Eat. Man. Ed. 2: 358 †; Ed. 3: 390; Eat. & Wright, N. Am. Bot. 357; Wood, Bot. & Flor. 263 (1873) †.

P. viscosa Pennsylvanica Wood, Class Book 299 (1845); 441 (1855).

Perennial; rootstock thick and somewhat fleshy; stem $\frac{1}{2}$ –1 m. high, erect, dichotomously branched, somewhat angular, more or

*Approaches *P. heterophylla ambigua* in the form of the leaves, pubescence in some specimens somewhat stellate.

† Some of these references include also the true *P. lanceolata* Michx.

‡ These references belong questionably to this species.

less strigose-hairy with flat hairs, sometimes somewhat glandular, or in some forms nearly glabrous; leaves ovate-lanceolate, tapering to both ends, 3–6 cm. long, generally more or less sinuately dentate, often yellowish green; peduncles 1–2 cm. long, generally erect, in fruit curved, but scarcely reflexed; calyx strigose, hirsute, or at least puberulent, lobes triangular or broadly lanceolate, nearly equalling the tube; corolla sulphur-yellow with purplish spots, $1\frac{1}{2}$ – $2\frac{1}{2}$ cm. in diameter; anthers yellow; fruiting calyx pyramidal-ovoid, 5-angled and sunken at the base; berry reddish.

P. Virginiana is, next to *P. heterophylla*, the most common of our species. It grows in rich soil and frequents open places, such as fields, roadsides, borders of woods. Specimens from about 100 localities have been examined, which show that it is common from Michigan and Minnesota to Colorado and Louisiana. Besides I have seen specimens from the following states:

New York: Dr. N. L. Britton.

South Carolina: Wm. Canby.

Florida: Chapman.

Georgia: Le Conte.

Manitoba: E. Bourgeau, 1859.

Like *P. heterophylla*, it is very variable. The original form described and figured by Miller is more densely hairy, with longer hairs, sometimes even somewhat glutinous, and with broad and more deeply sinuate-toothed leaves. It is comparatively rare and probably had not been seen by Gray, when he applied the name *P. Virginiana* to *P. heterophylla* Nees. The following specimens of this form are in our herbaria:

Illinois: Vasey.

Michigan: C. F. Wheeler, 1890.

Minnesota: Dr. Jarvis; J. H. Sandberg, no. 975, 1891.

Iowa: Hitchcock, 1889; J. A. Rolfs, 1891.

Tennessee: Gattinger, 1886; Scribner, 1890.

Missouri: L. H. Pammel.

Kansas: J. E. Bodin.

Wisconsin: S. N. Watson.

The common, less hairy form has more indistinctly toothed leaves. The usual color of the plant is more or less yellowish green. The Florida specimens are more slender and have thinner leaves, and are in some cases hard to distinguish from forms of

P. arenicola. In the upper Mississippi Valley, a dark verdigris-green form, with small thickish sinuately lobed, nearly smooth and shining leaves and short and wide fruiting calyx, is sometimes found. It is represented by the following specimens:

Illinois: W. S. Moffatt, 1893.

Wisconsin: E. A. Mearns, 1890.

Minnesota: G. B. Aiton, 1890.

There is also a form near *P. Virginiana*, the position of which is uncertain. It is temporarily placed here as a variety:

***Physalis Virginiana intermedia* n. v.**

Leaf very thin and subentire, gradually tapering in to a winged petiole; pubescence in the young plant somewhat viscid.

This is a very peculiar plant, in pubescence and flower resembling forms of *P. heterophylla*, in the form of the leaves recalling *P. lanceolata*, but in their texture *P. Carpenteri*. The general habit and fruiting calyx are those of *P. Virginiana* which it comes nearest. The following specimens are preserved in the herbaria;

Southern States: S. B. Buckley (type).

Alabama: S. B. Buckley.

Texas: Lindheimer, 1828.

Indiana: N. L. Britton.

21. ***Physalis arenicola* Kearney, Bull. Torr. Bot. Club, 21: 485. 1894.**

Stems 2-4 dm., slender, much branched, striate, from a slender creeping rootstock; plant light green; pubescence mostly of simple hairs, but sometimes a little glandular, in age scarcely any, except on the veins of the calyx; leaves usually small, blade $1\frac{1}{2}$ -6 cm. long, but sometimes up to 8 cm., ovate, cordate, truncate or cuneate at the base, irregularly angulate-dentate, pubescence, if any, along the veins, which are generally prominent and conspicuously reticulated; peduncles slender; calyx-lobes triangular-lanceolate, equalling the tube; corolla $1\frac{1}{2}$ -2 cm. in diam., light yellow; anthers yellow; fruiting calyx 3 cm. long, narrowly ovoid or rather oblong-pyramidal or nearly cylindrical, conspicuously reticulated; berry light yellow.

It much resembles certain forms of the preceding species, but is generally more slender, light green, but not yellowish. As the name indicates, it grows in sandy soil, and seems to be limited to Florida. The following specimens have been examined:

Florida: G. V. Nash, no. 1170, 1894 (type); B. F. Seeds,

1886; Bacon; Mary C. Reynolds, 1877; Chapman;* Fredholm no. 65, 1893; Curtiss, no. 2210, in part.† H. J. Webber, no. 125.

22. *Physalis ciliosa* n. sp.

Perennial from a slender creeping rootstock, upright, branched, 2–3 dm. high; stem terete, scarcely striate, together with the pedicels and calyces ciliate with long and white jointed hairs; leaves 4–7 cm. long, ovate, truncate or slightly cordate at the base, subentire or with a few coarse teeth, sparsely hairy on the veins, long-petioled, thin and not conspicuously veiny; peduncles very slender; calyx turbinate, resembling that of *P. arenicola*; corolla funnelform-campanulate, apparently without dark markings; fruiting calyx ovoid-pyramidal, sunken at the base.

In habit it most resembles *P. heterophylla ambigua*, but differs in being much more slender, in the thin leaves, in the longer and finer hairs and in the corolla, calyx and peduncles, which are those of *P. arenicola*. It might have been included in the following group, but it lacks the short dense pubescence, which is characteristic to the species belonging there. The following are the specimens found in our herbaria.

Florida: Chapman (in Herb. J. Donnell Smith, Harvard University, Columbia College, and A. W. Chapman, type); Curtiss, no. 27, in part.

Tennessee: Gattinger (in Herb. of J. Donnell Smith and Wm. M. Canby).

Georgia: Darby (?), Wm. M. Canby, 1869. (?)

VI. *Heterophyllae*: Perennials from a slender rootstock or stout caudex; pubescence dense, not stellate, short, more or less viscid or glandular (except in *P. Peruviana*), often mixed with long flat jointed hairs; fruiting calyx more or less distinctly 5-angled and, except in the last species, more or less sunken at the base; leaves from oval or rhombic to reniform.

23. *Physalis Peruviana* L. Sp. Pl. Ed. 2, 1670. 1763. Willd. Sp. Pl. 1: 1022; Nees, Linnaea, 6: 464; Don, Gard. Dict. 4: 449; Walp. Rep. 3: 24; Dunal in DC. Prod. 13: part 1, 440; Roxb. Fl. Ind. Or. Ed. 2, 1: 563; Gray, Syn. Fl. 2: part 1, 233; Roem. & Sch. Syst. Veg. 4: 674.

P. esculenta Salisb. Prod. 132. 1796. Willd. Act. Nat. Cur. Berol. 4: 197; Roem. & Sch. Syst. 4: 674.

* Between this and *P. Virginiana*.

† Specimens with very large nearly smooth leaves, but the form and pubescence of the calyx show that it belongs here. Probably an overgrown individual.

P. tomentosa Medic. Act. Theod. Pal. 4: 184. 1780.

P. pubescens R. Br. Prod. Fl. Nov. Hall, 1: 447. 1810. Spreng. Syst. 1: 698.

P. tuberosa Zuccagn.; Sav. Roem. Coll. 130. 1809. Obs. Cent. 43.

P. edulis Sims, Bot. Mag. *pl.* 1068. 1807. Cyr. Balb. Cat. Hort. Tour. 58. 1813.

Alkekengi pubescens Moench, Meth. 473. 1774.

Herschella edulis Bowdich, Excurs. Mader, 159. 1825.

Perennial from a creeping rootstock, tall, erect, densely pubescent, but the hairs short; stem angled; leaves large, ovate-cordate with a distinct long acumination, 5-15 cm. long, 4-10 cm. wide, subentire or sinuately few-toothed; petioles 2-4 cm. long; calyx villous; lobes lanceolate, acuminate, as long as the tube; corolla about 2 cm. in diameter; anthers generally violet; berry viscid, yellow.

A native of South America. It is cultivated for its fruit in all warm and temperate regions and often escapes.

Michigan: L. H. Bailey, no. 5. 1887.

New Jersey: I. C. Martindale, 1879 (ballast).

Physalis Peruviana latifolia (Lam.) Dunal in DC. Prod. 13: part 1, 440. 1852.

P. latifolia Lam. Ill. 2: 29. 1793. Roem. & Sch. Syst. Veg. 4: 676.

P. Barbadosensis Lam. Enc. Meth. 2: 102. 1786.

Leaves larger, rounded, cordate; base more decidedly cordate than in the species, stem stouter.

Also cultivated and escaped. The only specimens seen in our herbaria are from Golden Gate Park, Calif., collected by F. O. Vincent (Herb. Calif. Acad. Sci.).

24. ***Physalis heterophylla*** Nees, Linnaea, 6: 463. 1831. Don, Gard. Dict. 4: 449; Walp. Rep. 3: 24; Dunal in DC. Prod. 13: Part 1, 439.

(?) *P. viscosa* Jacq. Hort Vind. 2: *pl.* 136. 1772. Not L.

P. viscosa Pursh, Fl. Am. Sept. 157. 1814. Torr. Fl. N. & M. U. S. 233; Comp. 110; Fl. N. Y. 103; Beck, Bot. 257; Ed. 2, 255; Darl. Fl. Cest. 27, 1826; 138, 1837; Eat. Man. Ed. 2, 358; Ed. 3, 390; Ed. 5, 328; Ed. 6, 262; Eat. & Wr. N. A. Bot. 356; Gray, Man. 354; Ed. 2, 340; Ed. 5, 382; Wood, Class-Book

447, 1855; 579, 1863; Bot. & Flor. 263, 1873; Noll, Fl. Pa. 282; Chapman, Fl. So. St. 350; Porter & Coulter, Syn. Fl. Colo. 110; Holzinger, Cont. U. S. Nat. Herb. 1: 170. Not L.

P. nutans Walt. acc. to Nees, Linnaea, 6: 463; Don, Gard. Dict. 4: 451; Walp. Rep. 3: 27; Roem. & Sch. Syst. 4: 681. Not Gmelin.

P. Pennsylvanica Willd. acc. Nees. Linnaea, 6: 463. 1831. Hook. Fl. Bor. Am. 2: 90. 1834. Not L.

P. Virginica Gray, Proc. Am. Acad. 10: 65. 1874.

P. Virginiana Gray, Syn. Fl. 2: part 1, 235. 1878. Coult. Man. Rocky Mts. 270; Cont. U. S. Nat. Herb. 2: 300; Wats. & Coult. in Gray, Man. Ed. 6, 375. Not Mill.

Perennial from a slender creeping rootstock, $\frac{1}{2}$ –1 m. tall, at first erect, later generally decumbent and spreading, viscid and glandular, and villous with long spreading jointed flat hairs; leaves large, blade generally over 5 cm., generally broadly cordate, often acute but very rarely with an acumination, thick, more or less sinuately toothed, or sometimes subentire; calyx long-villous; lobes triangular, generally shorter than the tube; corolla $1\frac{1}{2}$ –2 cm. in diameter; anthers generally yellow; berry yellow.

P. heterophylla grows most commonly in rich soil, especially where the surface has been disturbed in some way, as for instance in fields, on road banks and rubbish heaps. Its range is from New Brunswick and Saskatchewan to Colorado, Texas and Florida, but it is most common in the Upper Mississippi Valley. A few specimens have also been collected in California. Specimens from over 100 localities have been examined. These show that it is nearly impossible to characterize any good varieties, as the species is very variable and the different forms grade into each other.

In shaded places, as, for instance, among bushes, it often becomes upright, nearly smooth, scarcely at all viscid, and with large and thin leaves. The author has described it as var. *umbrosa*,* but it scarcely deserves a varietal rank. A few of the specimens represented by this form are:

Nebraska: P. A. Rydberg, no. 1398, 1893; Smith & Pound No. 78, 1892; Le Roy; Hayden, no. 242, in part, 1854.

Illinois: H. F. Jaeger.

Iowa: Hitchcock, 1889.

Texas: Bigelow (Wipple's Exp.).

*Cont. U. S. Nat. Herb. 3: 172. 1895.

In sandy soil, especially on the sandhills within the region of the Great Plains, it becomes low, upright, with thick leaves, and exceedingly villous, with grayish hairs. This form somewhat resembles the next variety, but is lower and generally has yellow anthers. A few of the specimens are:

Nebraska: P. A. Rydberg, no. 1287 and no. 1808, 1895; C. E. Bessey, 1887; H. Webber, 1889; Smith & Pound, no. 50, 1892.

Colorado: Parry.

Missouri: B. F. Bush, no. 9, 1892.

Iowa: Parry.

Manitoba: Bourgeau, no. 1, 1857-8.

Physalis heterophylla ambigua (Gray).

P. Virginica ambigua Gray, Proc. Am. Acad. 10: 65. 1874.

P. Virginiana ambigua Gray, Syn. Fl. 2: part 1, 235.

P. ambigua Britton, Mem. Torr. Bot. Club, 5: 287. 1895.

? *P. obscura* Torr. Fl. N. & M. U. S. 233. 1824. Comp. 110.

? *P. nyctaginea* Dunal in DC. Prod 13: part 1, 440. 1852.*

Tall and generally upright, very long-villous, scarcely at all viscid; flowers generally larger, anthers generally purplish, leaves usually dark green and of a firm texture, more or less acuminate at the apex, often subentire, and pubescent mainly on the veins of the lower surface; but in the type specimens and those cited with an asterisk, the leaves are thinner, of a lighter color, and sinuately toothed.

The position of this variety is very uncertain. It may be a good species, but it may also be simply a form of *P. heterophylla*, which itself is made up of many different forms. The variety *ambigua* seems to belong principally to the eastern and central States.

The following specimens have been examined:

Vermont: *A. J. Grout, 94.

Rhode Island: W. W. Bailey, 1880.

New York: Schweinitz (labelled *P. obscura*).

Ohio: A. E. Ricksecker, 1894; C. Wilkinson, 7826, 1892; H. C. Cowles, 1891.

*The author has labelled several herbarium specimens *P. heterophylla nyctaginea* (Dunal) n. v., as it probably is *P. obscura* Torr., on which Dunal based *P. nyctaginea*, but it is better to adopt a newer but certain name instead of an older but very uncertain one.

New Jersey: W. W. Bailey.

Pennsylvania: P. E. Pierson, 1887; Dr. & Mrs. Britton, 1893.

West Virginia: C. F. Millspaugh.

Virginia: J. K. Small, 1892.

Georgia: A. P. Garber, 1877 and 1887.

Tennessee: Gattinger, 1882; *A. Gattinger, 1881; *Scribner, 1890.

Louisiana: A. B. Langlois, no. 1, 1880; no. 2, 1893.

Ohio: A. E. Ricksecker, 94; C. Wilkinson, no. 7826, 1892.

Indiana: A. H. Young, no. 40 (in part); 1875.

Michigan: C. F. Wheeler, 1890, *1891; *H. S. Camp, 1893; O. A. Farwell, no. 623, 1889; C. A. Davis, 1890; L. H. Bailey, 1885.

Iowa: F. R., 578; A. S. Hitchcock, 1886, 1887; B. Fink, no. 281, 1894; *Hitchcock, 1889; *P. H. Rolfs, 1890, *1891; *H. E. Crosby, 1888.

Wisconsin: *Lapham, *L. H. Pammel, 1887, *1891.

Missouri: Blankinship, 1889; D. Krause; *B. F. Bush, 1882.

Arkansas: A. E. Heacox, 1889.

25. *Physalis comata* Rydb. Bull. Torr. Bot. Club, 22: 306. 1895.

Perennial, erect, about 0.5 meter high; pubescence fine and short, that on the calyx, peduncles and upper branches mixed with long white flat jointed hairs; like *P. heterophylla* Nees (*P. Virginiana* Gray, not L.), but leaves smaller, blade not over 0.5 decimeter long, rounded, ovate, scarcely at all cordate at the base, about 5 centimeters long, thin, somewhat repand-dentate or nearly entire; petioles as long as the leaves; peduncles as long as the fruiting calyx or longer; corolla greenish yellow, with brown center, $1\frac{1}{4}$ –2 cm. in diameter; fruiting calyx as in *P. hederacfolia* Gray, but of thinner texture, 3–4 cm. long, rounded ovoid, somewhat 10-angled, scarcely sunken at the base.

The validity of this as a species may be doubted. It is intermediate between *P. heterophylla* and *P. hederacfolia* and might be placed as a variety of either with about equal reason. It, perhaps, most resembles the latter, but differs in the thinner texture of the leaves and the fruiting calyx, in the larger flowers, and in the long white hairs.

The following localities are recorded:

Nebraska: P. A. Rydberg, no. 269, 1891 (type); nos. 271 and 270, 1891.

Kansas: E. Bartholomew, no. 2, 1892; E. A. Popenoe, 1875.

Texas: G. Jermy, no. 618, 1890.

Colorado: Vasey, no. 462, 1868 (poor specimen of this species?).

A few specimens (Rydberg, nos. 270 and 271, especially the latter) are more grayish puberulent, have smaller flowers, and more rhomboid leaves, which are somewhat decurrent on the petioles and more oblique at the base. They are similar to specimens in the Harvard Herbarium received from Jardin des Plantes, Paris, and labelled *P. chenopodifolia*. I therefore took this form for *P. chenopodifolia* Lam. Although that species is also grayish pubescent, it is distinct from my plant, as can be seen from the original description. *P. chenopodifolia* stands in the same relation to *P. Peruviana* as the present form does to *P. heterophylla*.

26. *Physalis hederæfolia* Gray, Proc. Am. Acad. 10: 65. 1874.

Syn. Fl. 2: part 1, 235; Coulter, Cont. U.S. Nat. Herb. 2: 300.

P. Alkekengi var. *digitalifolia* Torr. Bot. Mex. Bound. 153. 1858, not Dunal.*

P. mollis Torr. l. c., in part.

P. digitalifolia Britton, Mem. Torr. Bot. Club, 5: 288. 1895.

P. Palmeri Gray, Syn. Fl. 2: part 1, 235. 1888.

Erect and branched, rarely decumbent, 3–5 cm. high, from a thick perennial base, finely viscid-pubescent or villous; hairs generally short; leaves in the typical form broadly cordate or subreniform, coarsely and angulately sinuately toothed, more or less 3–5-ribbed, about 3–5 cm. in diameter; peduncles generally short, but in one form (*P. Palmeri* Gray), a little longer than the fruiting calyx; calyx finely viscid-pubescent; corolla about 1½ cm. wide; fruiting calyx ovoid, 5–10 angled, pubescent, 2–3 cm. long.

P. hederæfolia grows on rocky hills or high dry plains. It ranges from southern Colorado and southern California to Mexico. The following specimens are in the herbaria:

Colorado: Greene, 1880; Geo. Vasey (Powell's Exp.) no. 462, 1868.

Texas: Dr. V. Havard, no. 168 and 169, 1881; C. Wright, no. 528, 1849; J. Reverchon, no. 1340, 1882; Mrs. Thomson, no. 220, 1872; Bigelow in Mex. Bound. Surv. 1857; Schott in Mex. Bound. Surv.†

*DC. Prod. 13: Part 1, 438. 1852.

†Approaching *P. comata* in hairiness.

New Mexico: Thurber, 1851; Wright, no. 1597 and no. 1600, 1851-2; E. L. Greene, no. 31, 1877, 1880 and 1887; Vasey, 1881; H. H. Rusby, no. 310, 1881; E. A. Mearns, no. 121, 1892.

Arizona: Coues & Palmer, no. 165, 1865.

Southern California: Dr. Greggs, 191.

Mexico: Gregg, nos. 439, C. C. Parry, 11, 1878.

Mex. Bound. Surv. nos. 1024 and 1023.

A form with shorter and denser pubescence and more decumbent habit is var. *puberula* Gray. It is only represented by the following specimens:

Texas: Wright no. 528, in part (type); Buckley; V. Harvard, nos. 170 and 171, 1881.

Another form with slightly longer peduncles and more acutish leaves, which are scarcely cordate at the base, is *P. Palmeri* Gray, l. c. It forms a transition to *P. Fendleri cordifolia*. The only specimens representing this form are:

New Mexico: H. H. Rusby, no. 756, 1881.

Arizona and California: E. Palmer, no. 430, 1876; (type of *P. Palmeri* Gray).

Mexico. C. G. Pringle, no. 15, 1885; Gregg.

In my opinion they scarcely deserve varietal rank.

27. *Physalis rotundata*.

P. hederæfolia Holzinger, Cont. U. S. Nat. Herb. 1: 212. 1892.

Diffuse and spreading, much (generally dichotomously, zigzag) branched, from a perennial rootstock, densely and finely viscid-pubescent, generally more glandular than the preceding; leaves nearly orbicular with more or less cordate base, 2-4 cm. in diameter, with much smaller teeth than in *P. hederæfolia*: petioles short, more or less winged; peduncles short, in fruit scarcely more than half the length of the calyx; corolla 1½ cm. in diameter, greenish yellow with brownish center; fruiting calyx ovoid, scarcely angled, not sunken at the base.

It is very near the preceding species and perhaps only a variety thereof, but as it has a distribution distinct from that of *P. hederæfolia*, the ranges overlapping only little, it seems advisable to treat it separately. It can always be distinguished by its spreading habit, its smaller more rounded and less toothed leaves, and its more glandular pubescence. The following specimens are in our herbaria:

South Dakota: Williams, 1891 (type).

Nebraska: Webber, 1889; Woods & Saunders, no. 2182, 1893.

Kansas: C. L. Shear, no. 221, 1894; M. A. Carleton, no. 237 and 518, 1891. Kellerman, 1886; Fremont Exp. (?).

Colorado: L. F. Ward, 1881; Fendler, no. 679, 1847. H. N. Patterson, 1892.

New Mexico: E. L. Greene, 1880; Fendler, no. 679, 1847.

Texas: Havard, no. 169½, 1881.

28. *Physalis muriculata* Greene, Bull. Calif. Acad. 1: part 4, 209. 1885.

Perennial from a stout woody tap-root, glandular pubescent, branched from the caudex, 1-3 dm. high; leaves 1-3 cm. long, on petioles of the same length, oblong to ovate-cordate, pubescent and muricate; peduncles erect, 2-3 cm. long, in fruit curved, 3-5 cm. long, generally as long as or longer than the subtending leaves; calyx pubescent with short hairs; lobes lanceolate, shorter than the tube; corolla hairy on the outside, greenish yellow with brownish throat; fruiting calyx rounded ovoid, distinctly 16-angled, reticulate, puberulent, not sunken at the base.

C. C. Parry's plant, which is the only one collected within the United States, differs from the typical specimens, in the shorter peduncles, the ovate more crenate leaves, and more glandular pubescence. It is, perhaps, distinct, but sufficient material is lacking. *P. muriculata* is very nearly related to *P. Greenei*, from which it differs principally in being a perennial. It connects the perennial Heterophyllae group with the annual Leptophyllae.

Lower California: Ed. Palmer, no. 682, 1889. E. L. Greene, 1885.

California: (River Side) C. C. Parry, 1882.

- VII. *Stellatae*. Perennials from a slender (except in *P. Fendleri*) creeping root-stock; pubescence more or less stellate, at least on the margin of the calyx; fruiting calyx only slightly angled and seldom sunken at the base; lobes connivent. All the species grow in sandy soil and most of them near the coast. They intergrade more or less.

29. *Physalis mollis* Nutt. Trans. Am. Phil. Soc. (II.) 5: 194. 1834. Gray, Proc. Am. Acad. 10: 66; Syn. Fl. 2: part 1, 236; Coulter, Cont. U. S. Nat. Herb. 1: 300. Wats. Proc. Am. Acad. 18: 126.

P. tomentosa Dunal in DC. Prod. 13: part 1, 436. 1852. Not Medic.,* nor Walt.†

Perennial from a creeping rootstock, 3–6 cm. high, densely whitish or grayish tomentose with stellate pubescence; leaves rounded cordate or the upper broadly ovate, coarsely sinuately toothed; peduncles 2–4 cm. long, in fruit 4–6 cm. and reflexed; calyx densely stellate, lobes triangular, generally a little shorter than the tube; corolla 1.5–2 cm. in diameter, bright yellow with a purplish center, more or less stellate on the outside; anthers yellow or tinged with purple; fruiting calyx 3–5 cm. long, ovoid, acuminate, slightly 5-angled and a little sunken at the base.

P. mollis, in its most typical form, as for instance the type specimens of Nuttall and E. Hall, no. 500, is well distinguished by its leaves, which are cordate, coarsely angulate-toothed, very densely white-stellate and of a firm texture. Often, however, the pubescence is less dense and the broad teeth of the leaves less distinct and it passes into the first variety. A. A. Heller's no. 1453, from Texas, has the broad leaves, the large dentation characteristic of *P. mollis*, but in the thinness of the leaves, the pubescence and general habit, resembles more the South American, *i. e.*, the typical, form of *P. viscosa*. It must be regarded as a form intermediate between the two.

P. mollis ranges from Arkansas to Mexico. It grows in thickets and along streams, but rarely near the coast where its place is taken by *P. viscosa*. The following specimens have been examined:

Arkansas: Nuttall, 1834 (type); Bigelow, 1853; J. G., no. 304 and 326; F. L. Harvey, no. 1, 1881; H. E. Hasse, 1886.

Texas: Drummond, nos. 205 and 241; Schott; Geo. Thurber, no. 43, 1850; E. Hall, no. 500, 1872; F. W. Thuron, no. 16, 1890; Crawford, no. 44, 1892. (A. A. Heller, no. 1453, 1894.)‡

Mexico: Gregg, no. 27, 1848–9; no. (1+)§; Bourgeau, no. 112 (in part) 1865–6; J. G. Schaffner, no. 700, 1876†; Edw. Palmer, no. 948, 1880.

*Act. Acad. Theod. 4: 184. pl. 4. 1780.

†Fl. Car. 99. 1788.

‡See above.

§ Approaching var. *cinerascens*.

Physalis mollis cinerascens (Dunal) Gray, Proc. Am. Acad. 10: 66. 1874. Syn. Fl. 2: part 1, 236; Wats. Proc. Am. Acad. 18: 126; Coult., Cont. U. S. Nat. Herb. 2: 301.

P. Pennsylvanica cinerascens Dunal in DC. Prod. 13: part 1, 435. 1852.

Greener, less pubescent; leaves rounded ovate and less toothed, sometimes nearly entire; peduncles generally shorter and fruit somewhat smaller.

Thin leaved specimens approach much the broader leaved forms of *P. viscosa*, into which it may pass. It is much more common than the typical *P. mollis*, and extends farther north, to Oklahoma Territory, and west to California. The following specimens have been examined:

Indian Territory: Palmer, no. 212, 1868.

Oklahoma Territory: M. A. Carleton, no. 169, 1891.

Texas: Lindheimer, 1848; C. Wright, no. 52; Schott, 1852; Drummond, 175; E. Hall, no. 502, 1872; Reverchon, 1874; (Curtiss, no. 2210*), 1880; no. 679, 1882; Jermey, no. 174; Dr. Havard, no. 171, 172, 173, 175, 1881; Sutton & Hays.

California: Dr. Greggs, 1847*; Edwards, 1847; Edw. Palmer, 1875.

Mexico: Berlandier, No. 886 and 2316, 1830; Coulter, no. 1222; Wislizenus, no. 285, 1847; Mueller, 1855; A. Dugés, no. 412; J. S. Schaffner, 1876; C. C. Parry, 1878; Parry & Palmer, no. 641 and 648, 1878; Edw. Palmer, no. 949, 1880; Pringle, no. 148, 1891.

Physalis mollis parvifolia n. v.

Stems from a thicker caudex, slender, diffusely branched; leaves small, 1-2 cm. long, rounded or cordate, obtusely repand-dentate; fruiting calyx small, only 2 cm. or less long.

It resembles a diminutive form of the preceding variety, but differs, besides in size, by the thick caudex and the more angular leaves. It is perhaps the *P. Jacquini* of Dunal, but not the original one of Link. All specimens seen are from:

Texas: Drummond, no. 190, 1835; Lindheimer, 1842 (type); E. Hall, no. 502 (in part), 1872; Edw. Palmer, no. 2103, 1879; Girard, no. 135, 1880; (?) Mary Croft, 1880.†

*Thin leaved form intermediate between this and *P. viscosa*.

†Some of these specimens are nearly glabrous and with more cordate and subentire leaves and connect this variety with *P. crassifolia cardiophylla*.

30. *Physalis viscosa* L. Sp. Pl. 183. 1753. Ed. 2, 261; Willd. Sp. Pl. 1: 1021; Michx. Fl. Bor. Am. 1: 149; Spreng. Syst. Veg. 1: 697; Walp. Rep. 3: 23; Nees, Linnaea, 6: 457; Don, Gard. Dict. 4: 448; Sendtn. in Mart. Fl. Bras. 10: 129; Gray, Proc. Am. Acad. 10: 66, 1874; Syn. Fl. 2: part 1, 236; Dunal in DC. Prod. 13: part 1, 434; Roem. & Sch. Syst. Veg. 4: 672; Wats. & Coult. in Gray, Man. Ed. 6, 376; Coult. Cont. U. S. Nat. Herb. 2: 301.

P. Pennsylvanica L. Sp. Pl. Ed. 2, 1670. 1763. Willd. Sp. Pl. 1: 1021; Lam. Enc. Meth. 2: 100; Mart. & Gal. Bull. Brux. (V) 12: no. 2; Walp. Rep. 3: 24; Roem. & Sch. Syst. Veg. 4: 673; Ell. Bot. S. C. & Ga. 1: 278.

P. tomentosa Walt. Fl. Car. 99. 1788. Not Medic.* Darby, Bot. So. St. 451.

P. Walteri Nutt. Journ. Acad. Phil. 7: 112. 1834. Don, Gard. Dict. 4: 448; Walp. Rep. 3: 26; Eat. & Wr. N. A. Bot. 357.

P. nutans J. F. Gmelin Syst. 2: part 1, 382.

Alkekengi fissum Moench, Meth. 2: 472. 1794.

Perennial from a slender creeping rootstock, slender, creeping, cinereous with a dense stellate pubescence or in age rarely glabrate; leaves elliptic, oval or ovate, obtuse, thinnish, entire or undulate, in the typical South American form often cordate at the base, but rarely so in our plant; peduncles 1–2 cm. long; calyx stellate, lobes triangular, generally shorter than the tube; corolla greenish yellow with a darker center, 1.5–2 cm. in diameter; fruiting calyx 2–3 cm. long, rounded ovoid, scarcely sunken at the base; berry orange or yellow.

P. viscosa grows on the sea beaches or in sand near the coast. Its range extends from Virginia (?) to the Argentine Republic. The South American specimens generally have rather thinner and broader leaves, which are often somewhat sinuate. Specimens collected by A. A. Heller in Texas, no. 1453, 1894, are intermediate between the southern form and *P. mollis*. Narrower leaved forms pass into the variety.

North Carolina: Curtis.

Georgia: Curtis.

Florida: Wm. M. Canby, 1869 and 1889; Edw. Palmer, no. 375, 1874; Curtiss, no. 2210, 1879; no. 4847, 1894; J. Don-

*Act. Acad. Theod. 4: 184. pl. 4. 1780.

nell Smith, no. 416, 1884; Simpson, no. 563, 1892 (in part); Miss Lathrop, 1894; H. J. Webber, no. 69, 1894.

Texas: (A. A. Heller, no. 1453, 1894?).

California: Dr. Greggs, no. 643.

Mexico: Parry & Palmer, no. 648, 1878.

Bolivia: Miguel Bang, 969, 1891.

Paraguay: Morong, no. 1532, 1888-90; H. Parker.

7 *Physalis viscosa maritima* (Curtis).

P. Pennsylvanica Dunal in DC. Prod. 13: part 1, 435. 1852.
Not Linn.

? *P. lanceolata* Ell. Bot. S. C. & Ga. 1: 278. 1817. Darl. Fl. Cest. 139. Darby, Fl. So. St. 451; Wood, Class Book, 299, 1845; 447, 1855. Not Michx.

P. pubescens Eng. & Gray, Bost. Journ. Nat. Hist. 5: 227. 1845.
Not Linn.

P. maritima Curtis, Am. Jour. Sci. (II.) 1: 407. 1849. Bot. Zeit. 8: 530; Walp. Ann. 3: 155.

? *P. Jacquini* Link, Enum. Hort. Ber. 1: 180, ex. Nees.

P. viscosa Jacquini Don, Gard. Dict. 4: 448. 1838.

P. viscosa spathulaefolia Gray Proc. Am. Acad. 10: 66. (In part), 1874. Syn. Fl. 2: part 1, 236; Coult. Cont. U. S. Nat. Herb. 2: 301; Wats. Proc. Am. Acad. 18: 126. Not *P. Pennsylvanica spathulaefolia* Torr.*

Leaves spatulate to oblong, gradually tapering into the petiole, often thickish and of a firm texture.

This was included by Gray in *P. viscosa spathulaefolia*, but differs from the original *P. Pennsylvanica spathulaefolia* Torr., or *P. Elliotti*, in the texture of the leaves, the dense pubescence and the form of the calyx, which in the latter resembles an inverted truncate cone. Sea coasts from North Carolina to Texas.

North Carolina: Dr. Havard, 1880; G. McCarthy, no. 179, 1883.

Florida: Canby, 1869; Edw. Palmer, no. 37, 1874; Curtiss, 1875; J. H. Simpson, no. 563,* 1892 (in part); G. V. Nash, no. 198 and 1049, 1894;† Miss McFarland; A. A. Baldwin, 1893.‡

*Bot. Mex. Bound. 153. 1859.

†Approaching *P. viscosa*.

‡A thin-leaved form.

Texas: Lindheimer, no. 136, 1842-43 (type of *P. maritima* Curtis); Drummond, nos. I and 57, 1853; Edw. Palmer, no. 945, 1879.

31. *Physalis Fendleri* Gray, Proc. Am. Acad. 10: 66. 1874. Syn. Fl. 2: part 1, 236; Coulter, Man. Rocky Mts., 270.

P. mollis Torr. Bot. Mex. Bound. 153. (In part.) 1859. Not Nutt.

Perennial from a deep fleshy rootstock, 3-6 dm. high, much branched, finely puberulent, often somewhat stellate, especially on the calyx; leaves small, 1-4 cm. long, deltoid, ovate-lanceolate or somewhat cordate, more or less deeply sinuately toothed, acute; peduncles shorter than the petioles, 5-10, or sometimes 20 mm. long lobes of the calyx triangular, about the length of the tube; corolla yellow with a brown center, about 1 cm. in diameter; fruiting calyx rounded ovoid, obscurely angled, 2-3 cm. in diameter; berry yellow.

On dry plains and in rocky places, from southern Colorado and Arizona to Mexico. The following specimens have been examined:

Colorado: T. S. Brandegee, 1871 and 1877; Engelmann, 1874; Crandall, 1892; Miss A. Eastwood, 1892.

New Mexico: Fendler, no. 683, 1847 (mainly, type); Thurber, no. 224, 1851; Wright, no. 1599, 1851-2; Bigelow (Mex. Bound. Surv.), nos. 1 and 2, 1857; C. C. Parry, 1867; Rusby, no. 756.

Arizona: H. H. Rusby, 1883; J. G. Lemmon, no. 2849, 1882; 1893; M. E. Jones, no. 6059, 1894.

Mexico: Schaffner, no. 698, 1876; Parry and Palmer, no. 642, 1878; Edw. Palmer, no. 94, 1889.

Physalis Fendleri cordifolia Gray, Syn. Fl. 2: part 1, 395 (in the first edition, 1878; but not in the second).

Leaves much larger, more cordate and less deeply sinuately toothed.

More hairy specimens approach on one hand *P. mollis* and on the other *P. hederacfolia Palmeri* and the smoother ones *P. crassifolia cardiophylla*. The variety *cordifolia* extends a little further northwest than the true *P. Fendleri*.

Colorado: Brandegee, 1873; E. L. Greene; C. E. Bessey, 1886.

Utah: Edw. Palmer, nos. 363 and 369, 1877 (type).

Arizona: Edw. Palmer, no. 363; M. E. Jones, no. 6059, 1894.

New Mexico: Fendler, nos. 678 and 683 (in part), 1847; Geo. R. Vasey.

California: J. G. Cooper, 1860-61.

Mexico: C. C. Parry, 1878.

32. *Physalis fuscomaculata* De Rouville; DC. Prod. 13: part 1, 437. 1852.

Perennial, decumbent or ascending, greener than the rest of the stellate species; stems terete with decurrent ridges, a little pruinose-stellate; leaves small, 2-4 cm. long, ovate, somewhat oblique at the base, entire or repand, the upper often opposite; peduncles 1-3 cm. long, longer than the petioles and in fruit often as long as the leaves; calyx pruinose, a little stellate, on the margins stellate-ciliate; lobes triangular, shorter than the tube; corolla yellow with a dark spot; fruiting calyx subglobose, 10-angled, somewhat sunken at the base.

P. fuscomaculata has been regarded as a form of *P. viscosa*, which it comes nearest, but it differs in the pubescence and in its more branched habit and greener hue. It has somewhat the same relation to *P. viscosa* as *P. Fendleri*, or rather the var. *cordifolia*, has to *P. mollis*. It is a native of South America and, as far as I know, has been collected but once within the United States, viz., by C. Mohr, no. 27, in 1891, at Mobile, Ala., where it was growing among ballast. Mr. Mohr's specimens resemble perfectly specimens distributed by Cosson. These are from France, where the plant is introduced into the botanic gardens.

33. *Physalis Elliotti* Kunze in *Linnaea*, 20: 33. 1847. Walp. Ann. 1: 529; Dunal in DC. Prod. 13: part 1, 439.

? *P. lanceolata* Ell. Bot. S. C. and Ga. 1: 278. 1817.

P. Pennsylvanica spathulaefolia Torr. Bot. Mex. Bound. Surv. 152. 1859.

P. viscosa spathulaefolia Gray, Proc. Am. Acad. 10: 66, and Syn. Fl. 2: part 1, 335 (in part). Coult. Cont. U. S. Nat. Herb. 2: 301, in part.

Rootstock slender and creeping; plant often perfectly smooth, except the margins of the calyx-lobes, rarely sparingly stellate when young; leaves very thin and veiny, oblong, spatulate, broadly oblanceolate or in luxuriant specimens (as, for instance, one in J. Donnell Smith's herbarium) broadly oval, entire or wavy, decurrent into a winged petiole; peduncles 2-3 cm. long, slender, erect, but in fruit reflexed and often 5 cm. long; calyx generally

smooth, except the margin, which is stellate;* lobes triangular; corolla $1\frac{1}{2}$ –2 cm. in diameter, yellow with dark centre; fruiting calyx generally a little shorter than in the next species.

Specimens of this have been labelled *P. lanceolata* or *P. viscosa spathulaefolia*. The form of the calyx, which is nearly perfectly glabrous except on the margin, places this nearest to *P. angustifolia* into which it grades. The leaves often resemble in form those of *P. viscosa maritima*, from which they differ in texture and pubescence. The stellate species grade more or less into each other and it is difficult to draw the lines between them, but as far as this is concerned, the nearest relationship is with *P. angustifolia*, and if not regarded as a species it should be placed as a variety of that plant rather than of *P. viscosa*. The following specimens have been examined:

Florida: A. P. Garber, 1876; J. H. Simpson, 1889; Chapman, 1887; Rugel, 1843 (type); Dr. Hulse; Dr. Leavenworth; J. Donnell Smith, 1880†; A. P. Garber (in U. S. Nat. Herb.), 1876‡; Blodgett (in Columbia Coll. Herb.)§; Edw. Palmer, 376, 1874.

Texas: Schott, no. 30, 1853 (type of *P. Pennsylvanica* var. *spathulaefolia* Torr.).

34. *Physalis angustifolia* Nutt. Journ. Acad. Phil. 7: 113. 1834. Don, Gard. Dict. 4: 448; Walp. Rep. 3: 27; Gray, Proc. Am. Acad. 10: 67; Syn. Fl. 2: part 1, 236; Dunal in DC. Prod. 13: part 1, 451; Eat. & Wr. N. A. Bot. 357; Wood, Bot. & Flor. 263; Chapman, Fl. So. St. 350.

Rootstock slender, long and creeping; stem diffuse and branched, angled. Plants often perfectly smooth, except on the margins of the calyx-lobes, rarely sparsely stellate all over when young; leaves linear or linear-oblongate, tapering into the petiole, entire, thickish; veins, except the mid-rib, generally obsolete; peduncles 2–3 cm. long, filiform, generally erect, in fruit 4–5 cm. long and reflexed; calyx smooth, except the stellate ciliate margins of the rounded triangular lobes; corolla about 2 cm. in diameter, yellow with purple centre, anthers yellow; fruiting calyx

*This does not agree with Kunze's description, which gives it as hairy. The specimens in the Torrey Herbarium are in fruit, but there is no indication of hairiness except the stellate margin.

† Very broad-leaved forms.

‡ Broad-leaved form approaching *P. viscosa maritima*.

§ Form connecting it with *P. angustifolia*.

small, $1\frac{1}{2}$ –2 cm., ovate, obscurely angled and scarcely sunken at the base.

P. angustifolia grows on the beach or in sand near the coast. It ranges from Florida to Louisiana, but is most common on the Florida "keys."

Florida: Curtiss, no. 175, 1880, no. 2212; Chapman, no. 672, etc.; Bennett; Simpson, no. 249, 1891; Rafinesque (labelled *Onistis nutans* Raf.), no. 895, 1816–36; N. A. Ware (Nuttall's type).

Mississippi: S. M. Tracy, 1891.

Louisiana: Ingalls, 1835; A. B. Langlois, no. 109, 1895.

Alabama: C. Mohr, 1868.

VIII. *Versicolores*: Perennials from a stout root; fruiting calyx decidedly 10-angled, reticulate, open, lobes short, not connivent; flowers yellowish with a dark center, in age turning bluish; leaves not fleshy.

35. *Physalis versicolor* Rydberg, Bull. Torr. Bot. Club, 22: 307. 1895.

Finely pubescent, in age glabrate; stem from a stout perennial root, much branched, at first erect but later spreading, slender, obtusely angled; lower leaves reniform-cordate, the upper ovate, all more or less oblique at the base, sinuately toothed, 2–4 cm. long, on slender petioles which are generally a little longer than the blade; peduncles slender, about the length of the petioles; calyx-lobes triangular-ovate, shorter than the tube; flowers about 1 cm. wide, yellow or drab with brown spots in the center, turning bluish in drying; fruiting calyx thin, ovoid-cylindrical, reticulate, decidedly 10-angled, 2.5–3.5 cm. long, generally open at the mouth.

The specimens collected within the United States are more erect, and have larger leaves and fruiting calyces than the Mexican. Rare within the United States.

New Mexico: C. Wright, 1851 (Mo. Bot. Gard. Herb.).

Arizona: Treadwell, 1879 (Cal. Acad. Sci.).

Mexico, Guaymas: Ed. Palmer, 621 and 622*, 1887.

Physalis versicolor microphylla Rydberg, Bull. Torr. Bot. Club, 22: 307. 1895.

Like the species, but leaves only about 1 cm. long, deltoid, coarsely toothed; peduncles about twice the length of the leaves; fruiting calyx nearly spherical, 1.5 cm. long, tinged with purple.

Mexico, Guaymas: Ed. Palmer, no. 94, 1887 (herbaria of J. Donnell Smith, Columbia College, Professor Greene, etc.).

* No. 622 is not typical.

IX. *Crassifoliae*: Low branched perennials, from a stout caudex; fruiting calyx reticulate, open, lobes not connivent; flowers yellow, seldom with a dark center; leaves more or less fleshy.

36. *Physalis crassifolia* Benth. Bot. Sulph. 40. 1844. Walp. Rep. 6: 574; Dunal in DC. Prod. 13: part 1, 443; Gray, Proc. Am. Acad. 10: 66; Syn. Fl. 2: part 1, 235; Bot. Calif. 1: 541; Vasey & Rose, Cont. U. S. Nat. Herb. 1: 74 and 1: 133; Coville, Cont. U. S. Nat. Herb. 4: 167.

P. cardiophylla Newberry, Bot. Ives. Exp. 23. 1860.

Stems spreading from a perennial caudex, much branched; branches often spreading, minutely puberulent; leaves small, blade about 2 cm., ovate, deltoid or cordate, oblique at base, often repand, more or less fleshy, on petioles of the same length; peduncles about as long as the leaves; calyx-lobes short, triangular; corolla 1½–2 cm. in diameter; fruiting calyx 2–3 cm. long, 5–10-angled, reticulate and generally open at the mouth, sometimes tinged with purple, much resembling that of *P. versicolor*.

It grows in dry regions from Texas to California and Mexico. Specimens examined:

Texas: Wright, 1848.

Arizona: E. Palmer, no. 431, 1876; E. S. Clark, 1886; Engelmann, 1880; Lemmon, no. 483, 1881.

California: Vasey, 1880; C. R. Orcutt, no. 2192, 1890; 1894; 1889; Coville & Funston, nos. 214 and 976, 1891; S. B. & W. F. Parish, no. 16, 1882; S. B. Parish, 1894; no. 3144, 1894; Dr. A. Davidson, 1893; Parry & Lemmon, no. 286, 1876; C. C. Parry, 1875; 1881; 1882 (unusually pubescent.)

Lower California: C. R. Orcutt, 1886; Ed. Palmer, no. 76*, 1890; D. E. Bryant, 1888.

Barrier Island: Newberry in Ives Exped.

Physalis crassifolia cardiophylla (Torr.) Gray, Syn. Fl. 2: part 1, 235. 1878.

P. cardiophylla Torr. Bot. Mex. Bound. Surv. 153. 1859.

P. pubescens Wats. Bot. King's Exp. 5: 274. 1871.

Leaves larger, 3–5 cm. long, thinner and more decidedly cordate, plant generally more upright and sometimes more hairy, approaching *P. Fendleri cordifolia*, but grades into the species. Coville & Funston's no. 976, has the leaves of this variety but the general habit of *crassifolia*.

* With oval leaves and larger calyx.

The following are the specimens examined :

Utah: S. Watson (King's Exp.), no. 940, 1869 (labelled *P. pubescens*).

Nevada: P. W. Davis, 1880.

Arizona: Ed. Palmer, 1276; Wheeler, 1871.

California: Maj. Thomas, nos. 1, 2; Coville & Funston, no. 976; 1891; Bigelow in Whipple's Exp., 1854; G. R. Vasey, 1881; C. C. Parry; M. E. Jones, no. 3854, 1884; Schott, no. 2, 1855; S. B. Parish, 1880; Ed. Palmer, 1869.

Lower California: Ed. Palmer, 1869.

Mex. Bound. Surv., Schott, no. 1025.

Mexico: C. E. Lloyd, no. 434, 1894.

37. *Physalis hastata* n. sp.

(?) *P. crassifolia* Brandegee, Proc. Cal. Acad. (II) 2: 190. 1889.

P. glabra Brandegee, Proc. Cal. Acad. (II) 2: 190. 1889. : 156. 1890. Zoe, 1: 272. 1890.

Like the last, but more slender, perfectly smooth, branching nearly at right angles; leaves lanceolate, oblique at the base, often more or less hastate, 3-5 cm. long, longer than the petioles; peduncles generally longer than the petioles, but shorter than the leaves; fruiting calyx more ovate and shorter, otherwise as in *P. crassifolia*.

I have not seen the type specimens of *P. glabra* Benth.* Specimens collected by L. J. Xantus (no. 85, 1860) at Cape Lucas, Lower California, the type locality of *P. glabra* Benth., differ from *P. hastata* in the fruiting calyx, which is much smaller, scarcely reticulate and has connivent calyx lobes. All these characters agree with Bentham's description.

Mexico. Lower California: T. S. Brandegee, no. 422, 1890 (at Todos Santos, which is not far from the U. S. boundary).

§ 2. MICROPHYSALIS.

Perennials from a stout caudex, hirsutely glandular pubescent; fruiting calyx small, not angled, scarcely ribbed, open, its lobes not connivent, as long as the tube or longer. (One species approaches *Athenaea* in the structure of the calyx.)

* Bot. Sulph. 39. 1844.

38. *Physalis microphysa* Gray, Proc. Am. Acad. 21: 402. 1886.

Stem 2-4 cm. high, from a perennial root, branched; leaves small, ovate or cordate, repand-crenate; peduncles very short; calyx about 4 mm. long; lobes lanceolate, in fruit even often longer than the tube; corolla about 1 cm. in diameter; fruiting calyx only about 1 cm. long, open at the mouth.

It has not as yet been collected within the United States.

Mexico. Chihuahua: C. G. Pringle, nos. 116, 317, 1885.

§ 3. MEGISTA.

Flowers whitish, limb more distinctly 5-lobed; plant tall, hirsute or glabrate.

39. *Physalis Alkekengi* L. Sp. Pl. 183. 1753. Ed. 2, 262; Willd. Sp. Pl. 1: 1022; Don, Gard. Dict. 4: 448; Gmelin, Syst. 2: part 1, 381; Spreng. Syst. Veg. 1: 697; Dunal in DC. Prod. 13: part 1, 438; Walp. Rep. 3: 23; Gray, Syn. Fl. 2: part 1, 233; Eat. Man. Ed. 2, 359; Ed. 3, 390; Roem. & Sch. Syst. Veg. 4: 673; Wood, Class Book, 447, 1855; 579, 1863; Bot. & Flor. 263.

P. Halicacabum Crantz, Inst. 2: 370. 1766. Scop. Fl. Car. Ed. 2, 160. 1872.

Megista maxima Tourr. in Ann. Soc. Linn. Lyon (II.) 17: 115. 1869.

Alkekengi officinarum Moench, Meth. Suppl. 177.

Tall, $\frac{1}{2}$ -1 m., strict, from a creeping rootstock; leaves broadly deltoid, acute at both ends, repand or angularly toothed; peduncles about 5-10 mm., erect, in fruit reflexed; fruiting calyx obtusely 5-angled, retuse at base, often colored red; berry red.

It is a native of Europe and Asia; often cultivated for its fruit and sometimes escaped from cultivation, as for example:

New Jersey: Conrad.

Pennsylvania: I. Martindale, 1866; 1886.

Delaware: A. Commons, no. 2213, 1885.

3. *Quincula* Raf.

QUINCULA Raf. Atl. Journ. 145. 1832.

A low and diffuse, sparsely scurfy-granuliferous herb from a stout perennial root. Leaves from sinuate to pinnatifid, somewhat fleshy. Peduncles most commonly in pairs from the axils of the leaves, sometimes solitary or in fascicles of 3-5. Calyx campanu-

late, 5-toothed, in fruit inflated, sharply 5-angular and reticulate, enclosing the fruit; lobes connivent; corolla flat, rotate, pentagonal in outline, veiny, violet or purplish; anthers opening by a longitudinal slit. Seeds comparatively few, kidney-shaped, somewhat flattened, with thick margin, rugose-tuberculate.

The genus is represented by only one species, which has generally been included in *Physalis*, but it is so different from all the other species of that genus that it is better regarded as a distinct type. It was regarded as such by Rafinesque, but his description is faulty. As he, however, cites *Physalis lobata* Torr. as the type of the genus, his generic name must be taken up. Dr. Gray made it a section under the name of *Chamaephysalis*. *Quincula* differs from *Physalis* by the form and color of the corolla, by the different habit and by the seeds.

1. *Quincula lobata* (Torr.) Raf. Atl. Journ. 145. 1832.

Physalis lobata Torr. Ann. Lyc. N. Y. 2: 226. 1827. Mex. Bound. 152; Rothrock, Wheeler's Exp. 208; Gray, Proc. Am. Acad. 10: 63; Bot. Cal. 1: 541; Syn. Fl. 2, part 1; 233; Eat. and Wr. N. A. Bot. 357; Porter & Coulter, Syn. Fl. Colo., 110; Holz. Cont. U. S. Nat. Herb. 1: 212; Coulter, Man. Rocky Mt. 269; Cont. U. S. Nat. Herb. 2: 299.

P. Sabeanana Buckley, Proc. Acad. Phil. 1862: 6. 1862.

Perennial, low, spreading or prostrate, more or less scurfy-puberulent, stem obtusely angled and striate, much branched; leaves oblanceolate or spatulate to oblong, sinuately toothed or pinnatifid with rounded lobes, or rarely subentire, cuneate at the base, tapering into a margined petiole, thickish and veiny; peduncles 2-5 cm., in fruit reflexed; calyx-lobes triangular, acute, shorter than the tube; corolla purplish, 2-3 dm. in diameter; anthers yellow, tinged with purple; fruiting calyx about as wide as long, sharply 5-angled, sunken at the base.

Common on the high plains, at the base of the Rocky Mountains, extending from Kansas to California and Mexico. Specimens from about 80 localities examined.

4. *Leucophysalis*.

A tall erect viscid and villous annual, with entire leaves, decurrent on the petiole. Peduncles generally in fascicles of 2-4 from the axils of the leaves. Calyx campanulate, 5-lobed, at first a little inflated, but soon filled with and closely fitted to the berry, thin, neither angled nor ribbed, faintly veiny, open at the mouth,

lobes exceeding the fruit. Corolla rotate, white, sometimes tinged with purple and generally ochroleucous or yellow in the center, 3-4 cm. in diameter; limb plicate. Stamens inserted near the base of the corolla; filaments long and slender, anthers oblong, opening by a longitudinal slit. Style and stigma as in *Physalis*. Seeds kidney-shaped, flattened, punctate.

Only one species, hitherto included in *Physalis*, but all the characters of the corolla, as well as most of those of the calyx, point towards *Chamaesaracha*. The fruiting calyx however exceeds the fruit, and is, according to Prof. C. F. Wheeler, somewhat inflated at first. It is, however, never angled or ribbed as in *Physalis*.

1. *Leucophysalis grandiflora* (Hook).

Physalis grandiflora Hook, Fl. Bor. Am. 2: 90. 1834. Gray, Man. Ed. 5, 381: Proc. Am. Acad. 10: 63; Syn. Fl. 2: part 1, 233; Perkins, Bull. Torr. Bot. Club, 15: 219. Wats. & Coult. in Gray, Man. Ed. 6, 375.

Erect, tall, $\frac{1}{2}$ -1 m. high; stem somewhat angled, striate, more or less villous; leaves large, 10-20 cm. long, broadly ovate to lanceolate-ovate, generally acute and entire, decurrent on the petiole, more or less villous and viscid, especially on the veins of the lower surface; peduncles several from each axil, short, $1\frac{1}{2}$ -2 cm. long, villous; calyx villous; lobes lanceolate, equalling the tube; corolla large, 3-4 cm. in diameter, rotate, white with a more or less yellowish center; filaments slender; anthers short, yellow, often tinged with purple; fruiting calyx ovoid, early filled with the berry.

From Lake Champlain and the St. Lawrence to Saskatchewan and Minnesota, according to Gray, "springing up in new clearings." Specimens examined:

Michigan: C. F. Wheeler, 1880; 1890; Sherman; Dr. Robbins, no. 181, 1863; J. W. Robbins no. 165, 1863.

Wisconsin: J. H. Sandberg, 1887; 1890.

Minnesota: J. H. Sandberg, nos. 201 and 1070, 1891; 1890; E. P. Sheldon, no. 2605, 1892; G. B. Aiton, 1891; F. F. Woods, 1889; Otto Lugger, 1891; L. H. Bailey, no. 242, 1886.

Canada: Hooker (?); Macoun no. 1417, 1873; Geo. G. Kennedy, 1892. *Ont.* Pursh; J. Macoun, 1863, J. M. Macoun, 1884.

Vermont (Providence Island, Lake Champlain): G. H. Perkins, 1888.

Saskatchewan: Bourgeau, 1857-8.

5. *Chamaesaracha* Gray.

CHAMAESARACHA Gray, Bot. Cal. 1: 540. 1876.

Perennials with entire to pinnatifid leaves, decurrent on the petiole; peduncles solitary, or in fascicles of 2-4 from the axils of the leaves; calyx campanulate, 5-lobed, in fruit somewhat enlarged, but not bladderly-inflated, close-fitting to the berry, thin, not angled, not ribbed, and faintly if at all veiny, open at the mouth, not exceeding the berry; corolla rotate, white or ochroleucous, often tinged with purple; limb plicate; stamens inserted near the base of the corolla; filaments long and slender; anthers oblong, opening by a longitudinal slit; style and stigma as in *Physalis*. Seeds kidney-shaped, flattened, rugose-favose or punctate.

Chamaesaracha is an exclusively North American genus, consisting of half a dozen species, all, except one, natives of Mexico and southwestern United States.

I. Plant erect; leaves entire; seeds punctate; a low canescent-strigose herb from a perennial rootstock. 1. *C. nana*.

II. Plant diffuse; leaves from crenate to pinnatifid; seeds rugose-favose.

a. Leaves broadly ovate, generally obtuse, crenate; lobes of the calyx ovate, obtuse. pubescence puberulent and viscid hirsute; berry 8-10 mm. in diameter. 2. *C. crenata*.

b. Leaves from obovate-rhombic to linear, subentire to pinnatifid; calyx-lobes triangular, generally acute; berry 5-8 mm. in diameter.

Pubescence dense, puberulent and hirsute. 3. *C. conioides*.

Pubescence sparse, puberulent or stellate, hirsute (if at all) only on the calyx. 4. *C. Coronopus*.

I. *Nanae*: Low and branching, erect, from a perennial rootstock; cinereous-strigose with entire leaves; corolla 2 cm. in diameter; calyx-lobes narrow or nearly subulate, very short; fruiting calyx hemispherical, not exceeding the berry; seeds finely punctate, thin.

1. *Chamaesaracha nana* Gray, Bot. Cal. 1: 540. 1876. Syn. Fl. 2: part 1, 233. 1878.

Saracha nana Gray, Proc. Am. Acad. 10: 62. 1874.

Low, less than 1 dm. high, grayish strigose, neither glandular nor viscid; leaves ovate-lanceolate to rhombic, decurrent on the long petiole, acute, undulate or entire, thickish; peduncles shorter than the petioles; calyx densely strigose and somewhat hirsute with white hairs; lobes narrowly lanceolate to nearly subulate, from a broad base, very short; corolla white or tinged with purple; berry purple (?).

This rare plant grows in the mountain regions of eastern and northern California.

California: Lemmon, no. 229, 1875; Bolander; Kellogg & Harford, no. 719, 1868-9; Geo. Engelmann, 1880; Michener & Bioletti, 1893; Mrs. Austin, 1875.

II. *Coronopodes*: Diffuse or spreading perennials, with more or less crenate lobed or pinnatifid leaves; calyx-lobes ovate or triangular, not longer than the tube; fruiting calyx not exceeding the berry; corolla 1-2 cm. in diameter; seeds thickish, rugose-favose.

2. *Camaesaracha crenata* n. sp.

C. Coronopus Wats. Proc. Am. Acad. 18: 126 (in part), 1883.
Not Gray.

Much branched from a perennial base, stouter than the two following; stem 2-4 dm. long, terete or slightly obtusely angled, more or less puberulent, or slightly stellate and hirsute with flat branched somewhat viscid hairs; leaves broadly ovate, obtuse, coarsely and irregularly crenate, puberulent and hirsutely ciliate on the margin and the prominent veins; blade 3-4 cm. long, decurrent on a petiole of about the same length; peduncels often in pairs, 4-6 cm. long; calyx generally more hirsute and viscid than the rest of the plant; lobes ovate, obtuse, about equalling the tube; corolla apparently smaller than in the next; berry comparatively large, 8-10 mm. in diameter, about 50-seeded.*

It is nearest related to *P. conioides*, but differs in its stouter habit, larger berries, ovate obtuse calyx-lobes, and the short and broad leaves. The following specimens have been examined:

Mexico: Edw. Palmer, no. 923, 1880 (U. S. Nat. Herb., type).

Texas: Bigelow (Mex. Bound. Sur., Rio Grande, 40 miles below San Elcearis. Specimen in the Torrey Herbarium).

New Mexico: C. Wright, no. 1598, 4851-2(?).†

*Another similar species is found in Central Mexico, which has the following characters:

CHAMAESARACHA VILLOSA n. sp.

Stem slender and striate, branched, more than 4 dm. long; the whole plant villos with branching hairs, especially on the calyx and the upper part of the stem; leaves rhombic-ovate, sinuately toothed and decurrent on the petiole; corolla small, only 10 mm. in diameter; calyx-lobes triangular, acute; berry small, about 5 mm. in diameter, containing about half a dozen seeds.

Mexico, State of Coahuila: Edw. Palmer, no. 924, 1880 (U. S. Nat. Herb. and Columbia College).

†Undeveloped specimen.

3. *Chamaesaracha conioides* (Moriciand) Britton, Mem. Torr. Bot. Club, 5: 287. 1895.

Solanum conioides Moric.; Dunal, in DC. Prod. 13: part 1, 64. 1852.

Withania (?) *sordida* Dunal, in DC. Prod. 13: part 1, 456. 1852, Torr. Mex. Bound. 155.

Solanum Linsecumii Buckley, in Proc. Acad. Philad. 1862: 6. 1863.

Saracha sordida Gray, Proc. Am. Acad. 10: 62. 1874.

Chamaesaracha sordida Gray, Bot. Cal. 1: 540. 1876. Syn. Fl. 2: part 1, 232; J. T. Rothrock in Wheeler's Exped. 208, 1878; Holzinger in Cont. U. S. Nat. Herb. 1: 212; Coulter, Cont. U. S. Nat. Herb. 2: 299.

Chamaesaracha Coronopus Wats. Proc. Am. Acad. 18: 126, in part. 1883. Not Gray.

Much branched from a perennial base, at first upright, at length spreading, cinereous-puberulent with short branched somewhat ulete or viscid hairs, generally also viscidly hirsute or villous with long and branched hairs, especially on the calyx; leaves oblanceolate to obovate-rhombic, generally acutish and tapering into a short petiole, generally deeply lobed, but varying from subentire to pinnatifid; calyx-lobes triangular, generally acutish; corolla about 1 cm. in diameter,* white or ochroleucous, sometimes violet purplish; berry from 5-8 cm. in diameter.

C. conioides grows on dry clayey soil from southern Kansas to California and Mexico. The most common form is very hirsute, often glandular viscid, but not at all stellate. The leaves are generally spatulate or broadly oblanceolate, and more or less lobed. To this form may be referred the following specimens:

Kansas: Gurney, 1891.

Oklahoma Territory: M. A. Carleton, no. 211, 1891.

Colorado: C. S. Crandall, 1892.

Texas: Bigelow, 1851 (Mex. Bound. Surv.); Schott, no. 4-7, 1851 (Mex. Bound. Surv.); 1852; Thurber, no. 185, 1851; G. R. Vasey, 1881; J. Reverchon, no. 67 b, 1882; M. E. Jones, no.

* Specimens collected by Edw. Palmer (no. 921 and 922, 1880) in Mexico, have flowers 2-2½ cm. in diameter. These are more robust and have also larger leaves, more decidedly rhombic in outline and lobed only above the middle, resembling the more entire leaves of *Verbena officinalis*. It may be distinct, but the material seen is insufficient.

3704, 1884; Mary Croft, no. 75, 1885-6; Reverchon (Curtiss, no. 2105).

New Mexico: C. Wright, no. 533, 1849; no. 1596, 1851-2; W. B. Pease; E. L. Greene, 1877; H. H. Rusby, no. 303, 1880; Dr. E. A. Mearns, no. 119, 1892.

Arizona: C. G. Pringle, 1884.

California: C. C. Parry, no. 3, 1852 (Mex. Bound. Surv.).

Mexico: Dr. Gregg, 1847; Dr. Edwards; E. L. Greene, 1880.

This form agrees very well with the description of *Withania sordida* Dunal, but a fragment of the type (Berlandier, no. 2076) is in the Torrey Herbarium, and this belongs rather to the less hirsute and more stellate form, which approaches *C. Coronopus*. This form has also generally narrower and less lobed, sometimes subentire, leaves. It served, if I mistake not, as the types from which the descriptions of *Solanum conioides* Dunal and *S. Linsecumii* Buckley were drawn. It is represented by the following:

Texas: C. Wright, no. 531, 1849; J. Reverchon, no. 676, 1891; V. Havard, 1883; Buckley, 1875 (*S. Linsecumii*).

Arizona: Rothrock, no. 471, 1874 (Wheeler's Exp.).

Mexico: Berlandier, no. 2076 (*Withania sordida* Dunal); E. Palmer, No. 926, 1880 (in part).

7 4. **Chamaesaracha Coronopus** (Dunal) Gray, Bot. Cal. 1: 540. 1876. Syn. Fl. 2: part 1, 232 and 436; J. T. Rothrock, Wheeler's Exp. 208; Coult. Cont. U. S. Nat. Herb. 2: 299; Wats. Proc. Am. Acad. 18: 126 (in part).

Solanum Coronopus Dunal in DC. Prod. 13: part 1, 64. 1852.

Withania Coronopus Torr. Bot. Mex. Bound. Surv. 155; Porter & Coulter, Syn. Fl. Colo. 110.

Saracha Coronopus Gray, Proc. Am. Acad. 10: 62. 1874.

(?) *Saracha acutifolia* Miers, Ann. & Mag. Nat. Hist. 1849, acc. to Gray, Bot. Cal. 1: 540.

Branched and diffuse from a perennial base; stem obtusely angled; pubescence on the stem and leaves more or less roughish pruinose or stellate, often scarcely any; on the calyx stellate or sometimes hirsute; leaves linear or lanceolate, tapering at the base, more or less sinuately lobed, occasionally subentire, sometimes pinnatifid; calyx-lobes triangular, acute; corolla white or ochroleucous, the appendages of the throat often protuberant; berry 5-8 mm. in diameter, nearly white.

C. Coronopus grows in clayey soil from Kansas to Utah, California and Mexico. It is very variable and the more hairy forms grade into the less hirsute ones of the preceding. In the typical form the pubescence is sparse or nearly none, and the lobes of the leaves are short.

Texas: Wright, no. 534, 1849; Mex. Bound. Surv. no. 1036; Bigelow, 1852 (Mex. Bound. Surv.); Lindheimer, no. 484, 1847-8; Reverchon, no. 1569; E. Hall, no. 496, 1872; Edw. Palmer, no. 920, 1880; A. A. Heller, no. 1647, 1894; Dr. V. Havard, no. 166, 1881; W. Garret, 1881.

Colorado: T. S. Brandegee, 1872.

New Mexico: Fendler, 675, 1847; C. Wright, no. 1593, 1852; M. E. Jones, no. 4147, 1884; E. L. Greene, 1880.

Arizona: Dr. E. A. Mearns, no. 214, 1884; McDougal, no. 524, 1891; Mrs. R. W. Hoyt, 1893; C. G. Pringle, 1883.

Utah: Capt. Bishop, 1872; Mrs. Thompson, no. 144, 1872.

California: W. F. Parish, 1884.

Mexico: Berlandier, no. 3023; Thurber, no. 730, 1852; Parry & Palmer, no. 653, 1878 (in part); Edw. Palmer, no. 926 (in part), 927 & 928, 1880.

The most striking of the different forms of this species is a very low (1 dm. high or less) and bushy one, more stellate-pubescent and with much smaller leaves which are pinnatifid with very narrow lobes. It is represented by the following:

Texas: C. Wright, no. 534, 1849; Bigelow, 1852 (Mex. Bound. Surv.).

New Mexico: C. Wright, no. 1594, 1851-2; Rusby, no. 302, 1880.

Mexico: Dr. Gregg; Parry & Palmer, no. 653 (in part) 1878.

6. *Oryctes* Wats.

ORYCTES Wats. Bot. King's Exp. 274. 1871.

Low, viscid-puberulent annual, with entire undulate leaves. Calyx campanulate, 5-cleft, with lobes longer than the tube, in fruit enlarged, membranaceous, but not inflated, closely fitting the fruit, neither ribbed nor angled, faintly veined. Corolla tubular with five short lobes, yellowish or purple. Stamens inserted below the middle of the tube, included, unequal, with very short anthers opening by a longitudinal slit. Fruit nearly dry, light

colored. Seeds nearly orbicular, very flat, faveolate-reticulate with a thin membranaceous margin.

Oryctes consists of one species, discovered and described by Dr. Watson. The original collection lacked specimens in good fruit, and his description is a little imperfect. Good fruiting specimens have been collected by Shockley, and these show that the fruiting calyx is enlarged just as much as it is in *Chamaesaracha*, which the plant also resembles somewhat in habit, and that the seeds are wing-margined.

1. **Oryctes Nevadensis** Wats. Bot. King's Exp. 274. 1871.

Gray, Syn. Fl. 2: part 1, 232.

Less than 1 dm. high, erect, branched, somewhat scurfy and viscid-pruinose, a little pilose with flat hairs; leaves ovate, obovate or lanceolate, decurrent on the petiole, entire, undulate, somewhat thickish; flowers in fascicles of 2-4 in the axils of the leaves, on short peduncles; calyx-lobes lanceolate, obtuse, shorter than the corolla; corolla tubular, about 6 mm. long, ochroleucous, blue or purplish; sinuses induplicate; berry nearly dry, light colored.

Western Nevada: Watson, no. 941, 1868 (type); Shockley, 1888.

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